ELECTRICAL REVIEW

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All-Purpose Electricity

Countering Retrogressive Proposals

TWO reports published this year under Government auspices have made a serviceable addition to the information generally available on the use of heat for all domestic purposes. The first—the "Egerton" Report—was, in effect, the work of a fact-finding commission: the second—the Simon Report—sought mainly to canalize the data presented in the earlier Report, to define the objectives of a national domestic fuel policy and to recommend how the latter could best be carried out. While further investigations and developments with time may prove some of the data to be based on incomplete information, the general aims—the need for improved standards of heating, lower costs, greater convenience, fuel economy and smoke abatement—are just those that electrical engineers have always done their best to further.

Distant Prospect

The means recommended for fulfilment of these admirable ideals are a very different matter. The Simon Committee, which included no electrical engineer, argued the case of those who hold that the end may best be achieved by saddling the public in perpetuity with myriads of individual solid-fuel systems. These, it is hoped, could be developed within the next twenty years to consume smokelessly the 50 million tons of bituminous coal (out of a total of 62 million tons) burnt annually in homes at upwards of twice the present thermal efficiency.

While it would be rash to set limits to what engineers could do in this way, there seems no good reason for asking them to make the attempt when a better and proven alternative already exists in complete electrification, requiring for the purpose under discussion only the granting of facilities for the construction of generating plant and electrical equipment of all kinds. Moreover, any expectation that improved solid fuel appliances can be mass-produced inexpensively seems to be negatived by the warning given in the Egerton Report regarding the effect of the varying constituents of coal in different parts of the country.

Pre-Electric Ideas

A principal weakness of the Simon proposals is that, although drawn up with a view to meeting the housing urgency, they have little to offer that promises immediate appreciable betterment of the admittedly unsatisfactory methods of solid-fuel combustion. They formulate what is essentially a long-term programme that harks back to pre-electric days. The relegation of electricity generally to intermittent and subordinate duties appears to be out of harmony with the view expressed by the Minister of Fuel and Power that cheap electricity should be abundantly available to all, since such a course would seriously prejudice the economics of its production and distribution.

Mr. Shinwell has also referred to the desirability of avoiding wasteful overlapping of different services. While electricity, as the rising tide of public favour makes evident, need not fear competition, it can justly claim, as the Memorandum

of the Electricity Supply Joint Committee and E.D.A. states (summarized in this issue), to be the only agent that is capable of being the sole medium for providing all domestic services. The views we expressed in commenting on the two Reports at the times of their publication have gained in cogency in the light of Mr. V. Z. de Ferranti's presidential address to the I.E.E. Domestic heating requirements would be far better met by burning low-grade coal in power stations than by tinkering with obsolescent small fireplaces that would still require selected fuels.

The Electricity Bill

AT last the threatened measure for the nationalization of electricity supply has been launched; it was introduced by Mr. Shinwell last Friday. At the time of going to press the text was not available but the extended title of the Bill foreshadows a "British Electricity Authority" with area electricity boards, one of which will be North of Scotland Hydro-Electric Board. Existing supply undertakings' "property, rights, obligations and liabilities" will be transferred to the Authority or boards. Further interest lies in the proposals to "amend the law relating to the supply of electricity, to make certain consequential provisions as to income tax."

Boiler Availability

SOME conclusions to be drawn from the research activities of the Boiler Availability Committee have been issued as an Interim Report, particulars of which are included in this issue. This Report is a digest of much of the matter discussed at the recent "Fuel and the Future" Conference, particulars of which were published by us on October 10th, and has an immediate bearing on present problems. It should be read in conjunction with the paper on pulverized-fuel firing by Mr. C. H. Sparks, summarized in this issue.

Cost of Delays

WHEN coal can be regarded as a store of raw chemicals and not principally as a means to raise steam or to warm buildings, it will greatly accelerate the maturing of the electrical era, which really began, Mr. E. R. Wilkinson suggested at Liverpool, with the part played by the grid in making electricity generally available. His reference to the increase in actual expenditure on frequency standardization over earlier provisional estimates illustrates how costly may be delays in carrying out measures of standardization (e.g., of voltages) even though their desirability is accepted.

"Super-Priority"

NOTHING can be done to avoid the next two winters being as bad and probably worse than the present one in regard to electricity supplies. Mr. Harold Hobson, chairman of the Central Electricity Board, declared, however, last week that it would be possible to prevent the shortage extending into 1950 if "super priority" was given to generating plant for labour and materials. As we have repeatedly emphasized, this priority must be given if the country's progress along the road to recovery, industrial expansion and a higher standard of living is not to be impeded. Exports represent only about 10 per cent of the total production and if restricted or banned would, in view of the competition from other countries, certainly be very difficult to resume when the present shortages at home have been overcome. In any case the banning of exports would produce no immediate benefit here. So much of the work on power stations is civil engineering, that it would probably be at least two years before any effect of the ban would become noticeable.

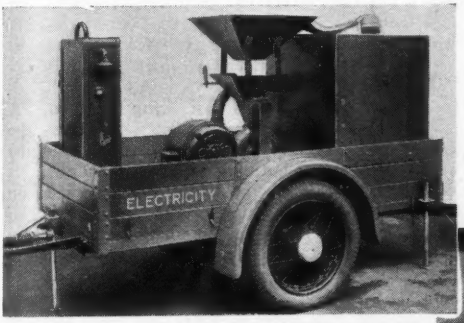
Farmers and Nationalization

AT a recent meeting of the Warwickshire branch of the National Farmers' Union a speaker advocated nationalization of electricity supply to get over a situation in which there was "one law for the townsman and another for the countryman." He thought that no capital charge for the supply of electricity should be made to the farmer. We wonder if he has ever tried to get a telephone from a nationalized service without paying for the necessary extension. These repeated demands for electricity at somebody else's expense really invite a *tu quoque* in the form of advocacy of the nationalization of the farming industry. This is very seldom suggested although food is as important as electricity and might be cheaper than it is considering the heavy subsidies which are paid for it. Why should the consumer have to pay for its cartage to the markets?

Reducing Farming Costs

Electrical Methods in Northamptonshire

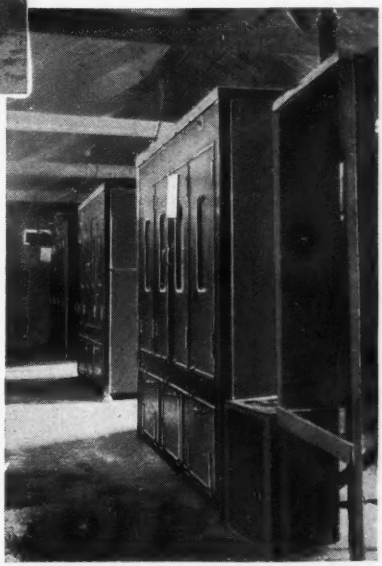
THOUGH greatly increasing numbers of farmers are beginning to "see the light" in regard to the adoption of electrical methods, far too many still look on electricity as desirable but outside their reach financially. In point of fact under present-day conditions no farmer who wishes to be successful can afford *not* to take full advantage of the facilities offered by electricity to increase production, to reduce labour costs, and to obtain a better price for his produce by improving quality. A visit we recently paid to a number of farms in the Northampton Electric Light & Power Co.s' area provided strong evidence of this and also supported the contention of Messrs. W. D. Kennedy and G. O. McLean (see *Electrical Review*, August 9th, 1946, page 215) that this country has little to learn from the American Rural Electrification Administration with regard to adequate and cheap supplies of electricity.



Nearly 150 " Essex " mills have been installed. Here is one mounted on a trailer for demonstration purposes

Under the R.E.A. tariff a typical farmer pays approximately 2·2d. per kWh for his energy. The average price paid under the Northampton Company's farm tariff is only just over a penny per kWh, several consumers actually getting their energy at little more than ¾d. This special farm tariff, which was introduced in 1932 and has now been adopted by nearly 900 of 1,500 farms in the company's 800 sq mile area, covers supplies for all general purposes except motors over 3 H.P. and dairy sterilizing equipment exceeding 6 kW. A fixed charge of 45 per cent is paid on the net rateable value of the farm house, 15 per cent being due in each of the winter quarters and 7½ per cent in each of the summer quarters. The r.v. for even quite a large farm is rarely above £20, so that this annual charge is generally well below £10. In addition there is a kWh charge of ¾d. All accounts are subject to a discount of 5 per cent for cash. The restrictions relating to use of extra large sterilizers and motors are not important and were really included in the tariff as a safeguard against apparatus that was not of a truly farming nature. Few farm sterilizers take more than 6 kW and since the introduction of the " Essex " mill there are few mechanical duties for which a 3-H.P. motor is not adequate.

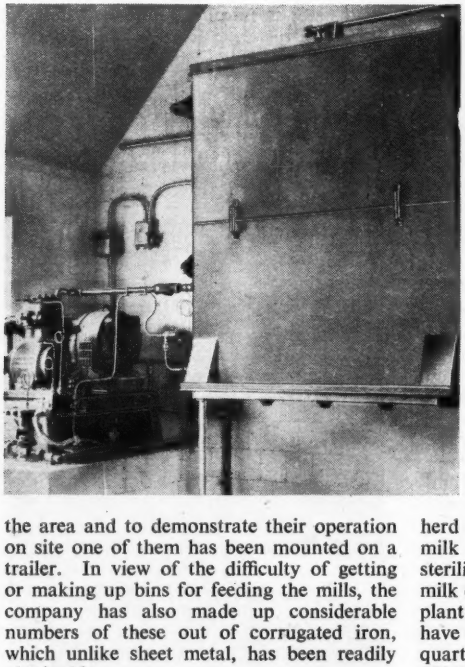
Altogether about half a million kWh was consumed last year under this tariff, the availability of which may be said to be responsible largely for the extensive use made of electrical equipment for bona fide



Examples of 16,000-egg incubators installed at Turney Brothers' farm

farm purposes. This is not an area where "farm supplies" consist of a few lamps and a radio set. With a very few exceptions all but the smallest of the dairy farmers have electric milking machines, while there are now about 200 sterilizers in use as well as large numbers of electrically operated pumps, corn grinders, chaff cutters, thrashers, milk coolers, cold rooms, incubators, brooders, saws, etc. In the farmhouses, too, electric cookers, water heaters, refrigerators, washing machines and vacuum cleaners are quite commonplace.

The company is particularly receptive to new ideas and was one of the first to appreciate the possibilities of the 3-H.P. "Essex" mill. Nearly a hundred and fifty of these remarkable units have now been installed in the area and to demonstrate their operation on site one of them has been mounted on a trailer. In view of the difficulty of getting or making up bins for feeding the mills, the company has also made up considerable numbers of these out of corrugated iron, which unlike sheet metal, has been readily obtainable.



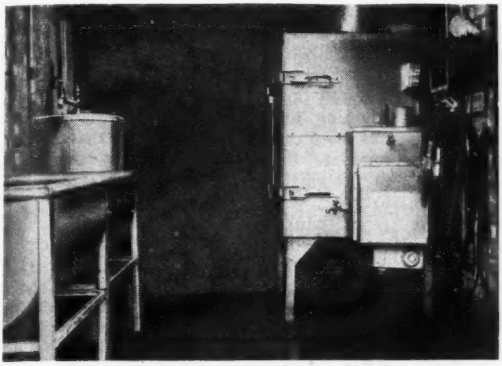
Milk cooler at Galley Lane Farm, Bletchley

Besides having installed a number of grass-drying plants, the company has recently been co-operating with the British Electrical and Allied Industries Research Association in experiments on hay finishing, and, although it is too early to draw final conclusions from the results obtained, the preliminary work has shown that this is a very promising field of application of electricity to farming processes. The experimental plant has been installed at Turney Brothers' farm at Quinton, which is also of especial electrical interest for many other reasons. It is one of the largest and most extensively equipped in the area and its 70-kW connected load covers a 25-H.P. hammer mill, 10-H.P. thrashing machine, 1-H.P. winnowing machine, 5-H.P. mixer, 2-H.P. cake breaker, 2½-H.P. root cutter, Alfa Laval milking machine (two 3-H.P. motors, one as standby), 1-H.P. hoist, 3-H.P. grain elevator, two 3-H.P. straw and grain elevators, two 3-H.P. pumps, four 16,000-egg incubators (6 kW each), ten electrically heated brooders (380 W), 3-H.P. poultry-food mixer, 1-H.P. tyre compressor, and a refrigerator, clocks and domestic apparatus. In addition a 10-H.P. plate mill is just being installed. A 100-kVA transformer provides the 230/400-V, three-phase supply and the metalclad switchboard installed is probably the largest we have seen on a farm, being of the type usually to be found in a small factory. The p.i.l.c.a. 4-core cables are taken in 6-in. ducts to the main points in the buildings. For this comprehensive range of electrical facilities this farm, which has a rateable value of £22 per annum, in a typical year (1943) consumed 57,814 kWh and received a bill for £217 13s. 7d. After allowing for the 5 per cent discount the average price paid per kWh works out at 0·86d.

An even lower average price has been achieved at Mr. R. Barbour's Galley Lane Farm, Bletchley. Here for a herd of about a hundred Ayrshire cows in milk use is made of a milking machine, sterilizer, electrode boiler (20 kW), and a milk cooler as well as cattle food preparation plant and domestic appliances. The premises have a rateable value of £18 and in last June quarter the cost for 10,512 kWh was only £33 6s. 5d., which, after the 5 per cent discount, represents an average charge of only 0·73d.

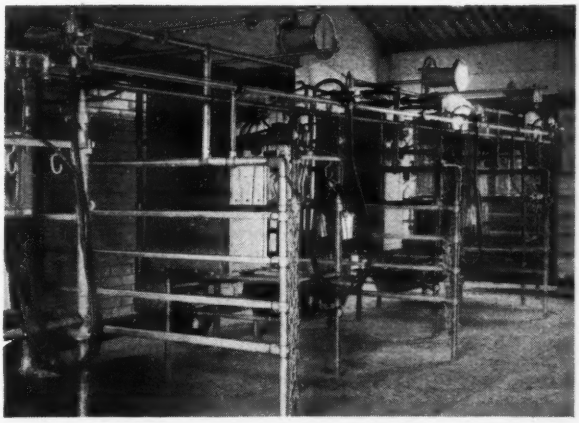
Even when consumption is quite small the average price paid per kWh is remarkably low. With an unusually high rateable value of £22, Mr. J. W. Shirley, of Pear Tree Farm, Woughton, who used 1,451 kWh in the June quarter for his "Essex" mill,

milking machine and a 6-kW sterilizer, paid only 0·98d. per kWh. With a still lower consumption (only 213 kWh) Mr. E. Dunkerley, of the Old House, Staverton (rateable value £8), paid 1·33d. Milking only about a dozen cows Mr. Dunkerley does not consider the installation of a milking machine as an economic proposition but he has an electric sterilizer, a bottle washer and an "Essex" mill. Incidentally he uses the mill to grind for fifteen other farmers in the district, having laid out the bin and tubing arrangements to facilitate reception of the grain and dispatch after grinding.



Compact water-heating and sterilizing plant arrangement at Capt. C. Jones' farm, Stoke Goldington

Another novel arrangement of an "Essex" mill is to be found at the Old Park Farm, Stoke Goldington, where Capt. Clifford Jones has taken the outlet tube direct to a receiving hopper in the cow byre. Capt. Jones says the mill has paid for itself in eight months. Apart from the fact that it costs about 12s. 6d. a ton for grinding elsewhere he reckons that using an "Essex" all the requirements of the farm can be met with only half an hour's attention by a farm hand a week. Eight man-hours a week were previously entered on the cost sheet for grinding.



Gascoigne auto-recorder milking plant just installed at Mr. W. H. Jones' farm, Staverton

Besides the mill, Capt. Jones has one of the most compact dairies we have seen. To handle the milk from his sixteen cows there is a Manus milking machine, a 15-gal water heater (1,500 kW) and a 6-kW sterilizer. A novel feature is that access to the sterilizing room from outside the building is discouraged by having the entrance from the dispatch room just large enough for a man to pass through, though of course of ample size for cans, etc. With a rateable value of £10, the cost for the 3,498 kWh consumed in the June quarter of this year was £11 13s. 6d. less discount, or 0·76d. per kWh.

This installation, like practically all in the area, has been carried out by the company's own Installation Department. Complete schemes are prepared and carried out and the company has the services of an agricultural engineer, Mr. Arthur P. Crooke, who, being a farmer himself, and is still running a small farm in his spare time, is well qualified to advise on agricultural matters. One of the most recent schemes for which the company has been responsible is nearing completion

at Mr. W. H. Jones' Vine Tree Farm at Staverton. Here a completely new building is being erected to accommodate a herd of fifty Friesians. Fluorescent lighting is provided throughout, and the milking parlour with its Gascoigne auto-recorder for eight cows is warmed with tubular heaters. There is a water heater for washing hands and an electrode boiler is on order.

At the moment farm installations are being undertaken at the rate of about two or three a week. Each application is carefully studied with a view to giving the maximum service and efficiency, with minimum cost, both capital and operating. Special attention is paid to the elimination of as much manual labour as possible, a feature which has a strong appeal to the farmer to-day in view both of the difficulty in obtaining farm hands and also of the rising wages. Apparatus of all kinds is available on hire-purchase terms spread over five years while in the case of new connections guarantees of consumption are required only for the larger installations. Apart from the normal farm advisory service, special demonstrations of equipment are given from time to time at the county agricultural shows, as well as at the company's main showrooms.

It speaks well for the company's methods that not once during our tour did we hear anything but praise of the facilities offered. Far from complaining that electricity is still too dear, the farmers we spoke to boasted of the smallness of the accounts they had to pay.

We thank Mr. E. G. H. Jackson, general manager of the company, for giving us facilities to visit the farms, and also Mr. J. B. Wilson, sales manager, Mr. A. P. C. Crooke and the various farmers, for their help in the preparation of this article.

Transformers in Germany

Report of Investigating Committee

IN a series of reports, some of which have been reviewed in this journal, the Intelligence Objectives Sub-Committee has dealt with the German heavy electrical industry. The subject of "Item No. 31" is "Motors and Power Transformers" (Stationery Office, 3s. net), which records the results of visits to five large works. Owing to war damage some of the information "had to be obtained by verbal discussions, which cannot be relied upon without reservations."

Some of the reservations necessary will be clear from perusal of the transformer section in particular. For example, it is stated that flux densities of B=16,000 to 24,000 lines per sq cm were used in Germany. Stalloy is saturated at approximately 20,000 lines, and a transformer designed with B approaching this figure would quickly burn out. No sheet steel capable of being used at B=24,000 is known in this country or in America, where B normally does not exceed 13,500. The losses in watts per kg given at B=10,000 show that the steel mentioned is inferior to British steels and does not justify the claim that "German practice seems to be a little ahead of others."

The permissible temperature rise of 60 deg C is stated to be "enormously high on the basis of standard British Specifications," but this figure (if it relates to resistance) has been used in B.S. 171 since 1936. A current density of 2,400 A per sq in. seems very high for ON transformers.

The efficiencies given should be related to voltage. The TMA standard losses for a 100-kVA transformer for 11,000/400 V give a full load efficiency of 97·5 per cent against 96·6 per cent quoted for a German transformer. For a 1,000-kVA transformer of the same ratio the corresponding figures are 98·55 per cent and 99·1 per cent. Butt-joint yokes appear to be used in Germany, but have not been British practice for many years, interleaved yokes giving less reluctance in the magnetic circuit.

It is stated that the use of "corrugated fins arranged all round the periphery of the tank . . . is considered superior to that . . . with tubes or pipes" and "the tube cooling method is only used on very large units about 15,000 kVA, and this to a limited extent." Corrugated tanks were discarded in this country over twenty years ago in favour of tubular tanks which give a higher cooling area. The height of a corrugated tank is greater than that of a tubular tank for the same output, and more oil is required. Elliptical tubes do not increase the range of dissipation of heat per unit area of surface; they enable a given length of tube to be "nested" in a smaller space, which, however, reduces effective radiation. The recurrent-surge generator is not new and has been in use in this country for some years.

N.A.L.G.O. Branch Meeting.—The Central London Electricity Branch of the National Association of Local Government Officers, which was among the first to be formed by a public utility company, held its annual general meeting on December 9th. Since the formation of the branch eight months ago membership has grown rapidly and the branch now represents approximately 80 per cent of the eligible staff.

Simon Report Rebutted

Electricity the Only All-Purpose Medium

A MEMORANDUM on the Report of the Fuel and Power Advisory Council (Cmd. 6762) on Domestic Fuel Policy has been drawn up by a committee appointed by the Electricity Supply Joint Committee and the Electrical Development Association. After citing the first reference of the Advisory Council, which was set up under the chairmanship of Sir Ernest Simon by the Coalition Government in November, 1944, to consider the efficient use of fuel in domestic and similar premises and the prevention of atmospheric pollution, the Memorandum refers to expressions of Ministerial views since the Report was presented on January 17th last.

At Blackpool in June, the present Minister of Fuel and Power, Mr. Emanuel Shinwell, put first the provision of electricity to all as cheaply as possible and gave as one of his primary objectives the integration of all forms of power and the avoidance of overlapping. In the same month the Ministry of Health commended the attention of the Simon Report to all housing authorities, requesting that each estate should be supplied, if practicable, with both electricity and gas. In July the Department of Health for Scotland sent out a similar communication. In view of the increase in expenditure entailed in providing electricity, gas and solid fuel, the present Committee suggest joint consultations between the Ministries concerned and the electricity supply industry before any such action is taken.

Committee's Formulæ Challenged

The formulæ used in the Report in arriving at efficiencies (derived from the "Egerton Report," Ministry of Works Post-War Building Studies No. 19) and the conclusions based on them are challenged. It is pointed out that the trend of public opinion is indicated by the annual increase in electricity supplied for domestic heating (which includes water-heating, cooking and auxiliary services). This advanced between 1921 and 1941 from 564 million to 9,874 million kWh. In 1943 the Standing Joint Committee of Working Women's Organizations found that "electricity is first choice for cooking with a majority in every area." The next year an inquiry instituted by the Scottish Housing Advisory Committee showed substantial majorities in favour of electric cooking and space heating, leading to a recommendation that socket outlets should be installed in all rooms except the bathroom. In Hull 80 per cent of prospective tenants of council houses preferred electricity for the same purpose. This trend is particularly noticeable among younger women. Further, the Housing Manual (1944) issued by the Ministries of Health and Works recommended the provision of a 3-kW socket outlet in all rooms of small houses. Between 1929 and 1939 the average domestic price was halved, while the number of electric cookers increased from 50,000 to 1,750,000.

The objectives of the Simon Report are the same as those of the electricity supply industry (namely good standards of heating, low costs, more convenience, national fuel economy and smoke abatement), subject to revision of its recommendations in the light of the foregoing observations. Since electricity is the only medium which can be used as the sole source of all domestic power, heating and lighting, it is urged that, subject to the preservation of individual choice, the industry and the Government should combine to ensure the widest use of electricity for all domestic purposes at an economic price. The Committee holds that while the nature of the supply of electricity into residences will remain unaltered for all foreseeable time, the methods of producing, distributing and using it will improve and that housing policy, therefore, should not be committed to a system of heating that may shortly become out-of-date.

Counter-Proposals

Comments upon the recommendations of the Simon Report follow. The use of solid fuel should be minimized to avoid cost of transport, refuse disposal, domestic labour, internal decorations, material deteriorations and atmospheric pollution. Electric heating appliances should be developed on a mass production basis to minimum standards, the Government in consultation with the electricity supply industry being responsible for ensuring proper testing. Codes of Practice that insist upon a general use of solid-fuel appliances are not acceptable; the use of such appliances as a condition of subsidy, whether for new or old houses, or their free issue is deprecated. The Committee accepts central heating as the main means of heating blocks of flats or large houses, but holds that the recommendation regarding the use of available supplies of smokeless fuel in individual houses and of bituminous coal in central plants should not be acted upon without investigations into modern developments. It does not accept the proposal that the main winter space- and water-heating load should be taken by solid fuel, in view of the greater costs of construction of premises and transport and handling of fuel and the atmospheric pollution this would entail. Electricity is fundamentally an all-purpose agent and when so used affords maximum benefits in price and service.

No objection is raised to free competition with other fuels over the whole range but only to its limitation to a sphere which would lessen

the benefits obtainable with free competition. Any division of load between different fuels would also militate against the furnishing of supplies in rural areas, since this depends upon the development for all purposes throughout the country.

The Simon recommendations regarding solid fuel would prevent free competition between electricity and gas, the prices of which are already regulated by the Ministry of Fuel and Power in consumers' interests. The industry, it is stated, would strongly object to any outside authority having jurisdiction over prices as a basis of competition and would disagree with the method of assessing electricity supply tariffs set out in an appendix to the Report. While it is held that only by the most extensive electrification can the prescribed standards of heating be provided at "lowest possible cost," objection is not raised to a flue for solid-fuel appliances in the living room but to the limiting of the means of heating by electricity or gas elsewhere to one bedroom, which is contrary to codes suggested by other Departments. The proposed obligation on the building owner to supply heating appliances should not be restricted to solid fuel, but the suggested provision of electric points in the main rooms is supported, and attention is drawn to the considerable saving through the elimination of flues; ventilating systems could, it is believed, be provided at lower cost. Where electricity is available, the solid-fuel store recommended in the Report would be unnecessary.

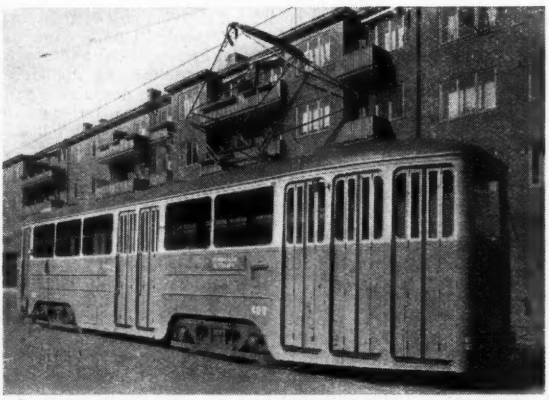
Information centres, which already exist, should remain the responsibility of the industries concerned, possibly with some co-ordination, and should not be established by the Government; their function should be explanatory in order to promote healthy competition and ensure a free choice to consumers.

The establishment of smokeless zones is not regarded as practicable and the need for them would disappear under electrification. The target aimed at in the Report of replacing in twenty years the 50 million tons of bituminous coal now burnt at a working efficiency of 20 per cent by smokeless methods having a coal economy of 40 per cent is considered to be outdated already by the possibilities of electrification.

New Stockholm Trams

Modernization and Extension Scheme

IN view of the gradual abandonment of tramways in London it is of interest to learn that the system in another capital, Stockholm, is being extended and modernized. One feature of the modernization is the introduction of a new type of tram which we are able to illustrate by the courtesy of the *Anglo-Swedish Review* (published by the Swedish Chamber of Commerce in London).



One of the new Stockholm trams

This is a single-deck vehicle accommodating 104 passengers (70 standing). It is 52·6 ft long and weighs 17 tons without passengers. The four 70-H.P. motors give it rapid acceleration and a maximum speed of 60 km per hour.

The interior arrangements are comfortable and tasteful. Some of the standing passengers are accommodated in the aisle between the rows of seats and others on the rear platform. A separate cabin is provided for the driver, the vehicle being designed for passing round a loop at termini.

Six pneumatically-operated doors are provided to facilitate loading and unloading and the stops are announced through loud-speakers by the driver. There are also illuminated stop indicators. The ventilation system effects a complete change of air every two minutes.

So far twenty of these new trams have been put into service; a further seventy are still under construction. The cost of the vehicles is said to be about £9,650 each.

Municipal Radio.—St. Marylebone Electricity Committee reports that it does not contemplate the sale of radio and television sets as there are many firms in the borough dealing with such equipment.

Industry and the House

Electricity Supply and Transport

PERHAPS, by seeking in each of these fortnightly articles a main theme linking the diverse Parliamentary references to the electrical industry, I am straining unduly to force a series of fragments into an unreal pattern of unity. Even if that is true, however, I still believe the attempt worth making. Parliamentary discussions are a current index of the importance which these various issues are assuming in the public mind—they indicate where the shoe is pinching, and how successful we are as a nation in cutting any particular suit according to our very limited cloth.

In writing "finis" to Parliament in 1946 my opening subject will be the generation of power, and I will conclude with a survey of the great clash on transport nationalization. Listening to the ebb and flow of discussion at question time these last two weeks I have been struck by the repeated references to power generation. Perhaps it is the shedding of load that has prompted the outburst; perhaps a preliminary lining up of facts and forces for the debate on supply nationalization; perhaps even the issue by the Conservative Political Centre of a timely and aptly titled booklet on "Power." Maybe all three have played a part.

By F. J. Erroll,
M.A., A.M.I.E.E., M.P.

The question of cuts was revived by Mr. H. D. Hughes from the Government benches, and the Minister in his reply stressed that the present shedding of load was due to shortage of generating plant, which was insufficient to meet peak loads on the public supply system. It did not arise from shortage of coal.

Perhaps this insistence that coal supplies were not to blame was yet another example of Mr. Shinwell's now famous inconsistencies. For only a week earlier he had conceded to Major P. Roberts that the quality of coal supplied for the purpose of generating was not all that could be desired. Major Roberts had referred to the C.E.B. statement that an occasional reduction of the load was caused by a regular loss of about 300,000 kW due to inferior quality fuel delivered to power stations feeding the grid. What action, the Minister was asked, was he taking to improve the quality and overcome the difficulty?

Mr. Shinwell in turn blamed the increased consumption, which had caused it to be "inevitable that some of the fuel supplied should be of poorer quality than formerly." No improvement in the quality could be looked for, he disconsolately added, whereupon Mr. Thornton-Kemsley leapt in with a suggestion as ingenious as it was impracticable. Why not, he asked, import supplies by submarine cable connecting Norway with the North-East of Scotland? "No, sir," was the Minister's brief but clear reply.

Giving details of cuts, Mr. Shinwell said that since November 1st the C.E.B. had found it necessary on eighteen days to issue instructions to undertakings to shed 5 per cent or 10 per cent of its load for periods averaging about half an hour. All seven areas into which the Board divided Great Britain had been affected, but the districts most affected were the Midlands and South-East. Reduction of load, he pointed out, did not necessarily involve cuts in electricity supplies. In many cases the strain was lightened by a reduction in voltage; in other cases large industrial consumers, on receiving an intimation, transferred part of their load to off-peak hours.

Ultimately, of course, it is a question of increased plant, and in details of progress the House is constantly interested. Mr. A. M. F. Palmer, formerly on the staff of one of the power companies and now M.P. for Wimbledon, asked for steps to be taken to reduce the delays in obtaining consent to the building of new power stations. The Minister's reply was little more than formal: "Close consultation is already taking place between the Departments concerned, which it is hoped will expedite the issue of the formal statutory consents required under the Electricity Supply Acts and Town and Country Planning legislation."

More specific in character were references to Manchester and Neasden power stations. The former city is to have a new station at Carrington in Cheshire adjacent to my own constituency, and Mr. Shinwell was asked to say what provision was being made to utilize the waste heat for houses and other development works. Particularly it was suggested that some arrangement should be made to supply such heat in the Urmston locality where the local authority had been authorized

to carry out a district heating scheme, and for the important industrial extensions in hand at Carrington and Partington near the site of the proposed new station. Through Mr. Shinwell, the Electricity Commissioners, the responsible authority, replied that no proposals had been submitted by Manchester Corporation.

Neasden Coal to Oil Conversion

The Neasden inquiry concerned a fuel oil conversion at the L.P.T.B. power station. The Minister of Transport, asked why he had approved the change-over, said it was not a matter for which his approval was necessary. Mr. Barnes gave the estimated additional operating cost as approximately £45,000 a year on the basis of existing prices for coal and oil fuels, and added that the measure was to be regarded as a permanent one. Questioned on the same subject, the Minister of Fuel said the conversion was a matter of expediency to ease the coal position. It was impossible to predict the exact effect on operational efficiency, but no great change was likely.

It is my impression that the Minister of Fuel himself pressed for this change, and that the L.P.T.B. acceded to the request because, being in a monopoly position, it would be able to pass on the additional cost to the transport "consuming" public. If I am right in this analysis, it is the first example of what may prove a regular practice: the dictation to owners of electric power stations by a Government Department of the fuel to be used.

Foreign Capital for British Industries

Light from a new angle was shed this fortnight on another subject I have previously reviewed. It may be remembered that Mr. F. A. Cobb, in the debate on the Ministry of Defence Bill, warned that foreign capital in British electrical firms might remove the effective control of research from this country. In the debate on the Exchange Control Bill, came an almost directly contrary viewpoint from Mr. David Eccles. Deprecating the placing of obstacles in the way of Americans investing money in this country, the Member for Chippenham appealed for a wider approach to this problem. Americans and Canadians, he said, considered that the British workman would turn out a good article at an economic price; they also believed that we could not fulfil our Bretton Woods obligations without stringent import licensing, making it necessary for them to manufacture in this country.

Denying that it was the intention of the clause under discussion to make dollar investment in Britain difficult, the Solicitor-General said there was no objection to the process in principle, "but each case must be considered on its merits, in order to see whether it is in accordance with the national interest." How such investment might fail to accord with the national interest was in no way clearly or satisfactorily defined. Perhaps Mr. Cobb's warning was being borne in mind. The whole issue, I feel, needs more careful examination, followed by a frank discussion.

Shortage of Steel

A general sense of frustration must unfortunately persist in the electrical industries during the present marriage of exhortation and short supplies. How many electrical firms, I wonder, have had the experience related by Mr. E. H. Keeling, who drew attention to posters urging greater output which had been sent to a company whose raw materials and coal had been cut to an extent that made it impossible to respond? Steel sheet continues to be one of the supply problems of the industry, and there was little comfort in the reply of Mr. Wilmot to a challenge from Mr. W. N. Warbey (on the Government side of the House) to say what steps were being taken to stimulate an increase in the output.

Until the proposed new continuous strip mill comes into operation, replied the Minister, the problem was primarily one of attracting more labour to the older handsheet mills which were "concentrated" during the war. Special arrangements had been made by the industry for the training of new entrants and for the payment of a bonus above the unskilled rate to trainees retained in the industry. Production from the two existing continuous strip mills was already very near its maximum, but efforts were being made to increase it. Subsequently an assurance was given by Mr. Belcher for the Board of Trade that no great quantities of steel sheet were being exported in the present emergency.

Debate on the B.B.C.

In the broadcasting debate, arguments about programmes and charges of corruption stole the news headlines, but there were a few references of interest to our industry. In opening, the Assistant Postmaster-General

recalled earlier discussions on the possibilities of frequency modulation and said the B.B.C. was keenly alive to the situation. One disadvantage lay in the fact that new receiving sets, or adaptors for present sets, would be required; but this had been foreseen, and discussions were proceeding between the Post Office, the B.B.C., the radio industry and the manufacturers.

Touching on television, Mr. Burke stressed the fact that after the wartime shut-down London was now the only place in the world from which daily programmes were sent out. He added the information that the number of wireless licences is now in the neighbourhood of 10,700,000, and the number of television licences 4,450.

On December 16th an apathetic House listened to the announcement of yet another advisory council for industry. This time it was Mr. Wilmot blandly giving birth to an "Engineering Advisory Council." Its object is to provide him with a means of consultation with employers and workers in the mechanical, electrical and radio engineering industries "on matters of general concern in the engineering field." For some time Mr. Jack Tanner, President of the Amalgamated Engineering Union, has been pressing for this council, though no one seems very clear what useful purpose it will serve. Names have still to be announced, and some familiar faces will meet round the table. Employers in particular wonder what good the Council can do, but dislike opposing the formation of additional consultative machinery in case they are accused of being obstructive.

Transport Bill Doubts

The House of Commons passed the second reading of the Transport Bill by 362 votes to 204. This was the first time that the Opposition vote had passed the 200 mark and indicated the widespread criticisms of a measure which will effect every man, woman and child in the country. With nationalization of the electricity supply industry only a little way off this Transport Bill poses the very pertinent question—how will electricity supply fare?

There are four different forms of compensation in the Bill, but the railway stocks correspond most nearly to electricity stocks and the Government's method in this case may provide the answer for electricity compensation. Compensation on the basis of current stock exchange quotations of the various railway stocks had a good reception when first announced; but when the Bill was published the attitude changed, which Mr. Dalton was not slow to drive home in a light-hearted reference to the fact that "quite an agitation seemed to have been started up on behalf of the railway stockholders." The reason for the change in outlook and the strong opposition to the compensation terms, a subject which occupied a full day in the three-day debate, was because, as Mr. W. S. Morrison vigorously asserted, "of a novel and malignant departure from normal practice in compensation. There had always been some element of arbitration. The House had never before been asked to combine the roles of purchaser and valuer."

No Guarantee of Efficiency

The Opposition then attacked the new organization which the Bill will set up. The Minister of Transport becomes the head of the greatest monopoly in the country with direct power to appoint nominees to the fifty-five most important positions. The Government did not reveal how this new monopoly was to be truly efficient and no one on the Government side was able to reply effectively to Mr. Peter Thorneycroft's denunciation.

Doubtless when the Bill for the nationalization of electricity supply is debated we shall hear much of the same sort of thing again and the electricity undertakings will be blamed for shortcomings which it was not in their power to remedy. Thus Mr. Dalton claimed that the railways were not in a position to finance maintenance or reconstruction of stations and other big permanent works.

Mr. Anthony Eden pointed out, however, that "the arrears of maintenance were piling up not because the railways had not the money to pay for renewals but because they could not get the necessary official sanction for the materials." With the prospect of continuing power cuts the Government will, if it continues its present style of argument, blame the electricity undertakings for lack of equipment and point out that a great deal of money will be required to provide it, but make no mention of the ban on new construction during the war.

Electricity Bill Introduced

As a fitting tailpiece to 1946 the Minister of Fuel and Power formally presented the Electricity Nationalization Bill on the last day of the sitting, December 20th.

Views on the News

Reflections on Current Topics

MOST of us hoped that one relief (and reliefs have been none too plentiful) when the war ended was to hear no more air-raid sirens. But many misguided authorities are using them to call out the Fire Service and now some Yorkshire towns—Hull and Huddersfield for example—are using them to warn citizens of impending power cuts. Few people like the system; the exceptions no doubt include those who have been caught in a lift between floors when a power stoppage has occurred. Manchester (being in Lancashire) has adopted a much better method. About seventy industrial concerns are on a system of special red lights which flash to an accompaniment of ringing bells when a cut is imminent.

* * *

Although it is proverbially ungracious to look a gift horse in the mouth, fear of the animal's bite is sometimes unavoidable. I earnestly hope that recipients of electrical presents this Christmas fared better than a correspondent who was given a small portable immersion heater. Its 380-W element, housed in a 6 by ¾ in. nickel-plated cylinder, is connected by long screws passing through a fibre disc (a tight sliding fit in the cylinder) to two terminals mounted very close to one another on the far side of the disc. To these terminals are attached the ends of some twin twisted flex which are taken through a wide hole in a wooden stopper to a b.c. lampholder. How long it would be before a steamy atmosphere might have unfortunate consequences is anybody's guess. Yet, I am informed, such contraptions are obtainable locally at something under a pound. Can no legislative attention be paid to protecting the man in the street against potential dangers of this kind?

* * *

With the increasing availability of electric washing machines the relative merits of wringing and spin-drying are likely to come in for a good deal of discussion. There is some difference of opinion as to their effectiveness, but probably it is safe to say that wringers are generally found better for close-weave materials, while spin-drying is better for open-weave. A considerable saving in ironing is achieved by dry wringing of certain articles, but if the washing and rough-drying processes are to become fully automatic, the use of a wringer is out of the question. In my opinion, the normal routine eventually will probably be spin-drying followed by pressing on a rotary ironer. However, there is a long way to go yet before the average housewife is induced to give up her wringer and iron and before her prejudices against the newer methods are overcome: prices too will have to come down considerably.

* * *

Central Europe has frequently been the source of strange inventions which, once mentioned in our press, are never heard of again. The latest is the production of a "62-year old Austrian shoemaker," who, says the *Sunday Express*, has devised electrically-warmed shoes. These are of normal shape, but between the outer and inner soles there is a duralumin plate surrounded by asbestos, connected with a small battery which fits into the cavity of the heel. This arrangement, rather unexpectedly, keeps the shoe constantly warm. The *Sunday Express* goes on to say that the invention was taken over by the *Wehrmacht*. Was this their Achilles' heel?

* * *

The Dundee *Courier and Advertiser* reports that the Fife Electric Power Co. is attaching to its accounts a tab bearing the statement:—"Nationalization means bad service and high prices." This may possibly prove to be true, but I think that until it is put to the test it is little wiser than the opposite slogan "Nationalization now means better times sooner." The proof of the pudding (or the "pie in the sky") will be in the eating.

* * *

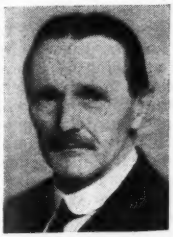
It is reported that the chairman of the U.S. National Farmers' Electrification Conference held recently in Chicago expressed the view that a large part of the staffs of most American farms would be replaced by electrical equipment within five years. This is an ambitious project which will be followed with great interest by British farmers and electricity supply authorities. By the way, the chairman's name, rather appropriately, was George Kable.

—REFLECTOR.

PERSONAL and SOCIAL

News of Men and Women of the Industry

AS we report elsewhere in this issue, **Sir Stanley Angwin**, B.Sc., M.I.E.E., has been appointed chairman of the new board of directors appointed for Cable & Wireless, Ltd., upon the transfer of the company's undertaking to the State. We are informed that Sir Stanley Angwin will relinquish the appointment of



Sir Stanley Angwin and Mr. J. Innes, chairman and managing director respectively of the new Cable and Wireless board

engineer-in-chief of the G.P.O., being succeeded by his deputy, **Mr. A. J. Gill.** The managing director of the board is **Mr. J. Innes**, C.B., B.Sc., M.I.E.E., who was formerly director of G.P.O. Telecommunications, but since 1942 has been with the Ministry of Fuel and Power.

In a farewell message to the staff, among the last official acts of **Sir Edward Wilshaw** as chairman of Cable & Wireless, Ltd., Sir Edward says that by every constitutional measure open to him he opposed the Government's designs because he believed that they would bring disaster on the service. Now having finished the fight, he wishes the State well with its new responsibility, and hopes that his misgivings may be proved to have been groundless. If he can be of service to the Government in an honorary capacity, he is willing to place himself at their disposal. He asks the staff to give Sir Stanley Angwin, the new chairman, the same loyalty as had been given to him.

The directors of the Stirling Boiler Co., Ltd., announce that, after thirty-nine years of service, **Mr. G. Summers** is retiring on December 31st from his position of general manager of the company, but will retain his seat on the board. **Mr. S. J. Whybrow** has been appointed to succeed Mr. Summers and has been elected to a seat on the board.

Mr. B. M. Burt, formerly with the Harland Engineering Co., Ltd., and, since 1933, vice-president and chief engineer of Bepco Canada, Ltd., flew to Britain on December 13th. He will spend several weeks visiting Bruce Peebles & Co., Ltd., Crompton Parkinson, Ltd., the Harland Engineering Co., Ltd., and Lancashire Dynamo & Crypto, Ltd., all of whom are represented by Bepco Canada, Ltd.

The British Trade Mission to China, of which **Mr. D. M. Buist** of B.E.A.M.A. was a member, returned by air to England last week.

The following appointments in the Department of Posts & Telegraphs, Palestine, have been announced: **Mr. E. J. Prichard,** O.B.E., M.I.E.E., to be engineer-in-chief, filling the vacancy resulting from the appointment of **Mr. D. H. Mackay,** B.Sc., M.I.E.E., as Deputy Postmaster-General. **Mr. A. G. Coates,** M.I.E.E., recently chief engineer of the Iraqi Posts & Telegraphs, becomes deputy engineer-in-chief, and **Mr. E. E. Cassell** fills the new appointment of assistant postmaster-general (telegraphs and telephones). Another recent appointment is that of **Mr. A. F. E. Evans,** O.B.E., M.I.E.E., as divisional engineer, Northern Division, Haifa. Mr. Evans was until recently district manager, Alexandria, in the Egyptian State Telephone Administration. Messrs. Prichard, Coates, Cassell and Evans all previously served in the British Post Office.

Mr. R. L. Axford, who as we briefly reported in our last issue has been appointed deputy borough electrical engineer at Newport (Mon.), received his education at Chafryn Grove School, Salisbury, and at Bradford Technical College. He joined the Bradford Corporation Electricity Department in 1910 as junior switchboard attendant, and two years later went to Portsmouth as switchboard attendant. In the following year he was appointed charge engineer with the Walthamstow Electricity Department, and in 1928 became generating engineer. He left Walthamstow in 1930 to join the Newport Electricity Department as station superintendent, and has subsequently held the appointments of second technical assistant and chief technical assistant. He is an associate member of the Institution of Mechanical Engineers.

Mr. R. L. Axford

Mr. J. E. Rapp, who was with Berry's Electric, Ltd., for a number of years before the war, has returned to open a new branch of this company at 5, Bystock Terrace, Richmond Road, Exeter. He will be in charge of the South West area. In April, 1940, Mr. Rapp rejoined the Merchant Navy for service in the Atlantic.

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At the annual meeting of the British Engineers' Association held in London recently the following were elected new members of the Governing Council:—**Mr. E. B. Ball,** managing director of Glenfield & Kennedy, Ltd., **Mr. C. D. H. Macartney-Filgate,** managing director, Tubes, Ltd., and **Mr. W. J. Ruston,** director, J. Stone & Co., Ltd.

Major R. Stanley Smith has been released from R.E.M.E. and has resumed practice as a consulting management and production engineer under the style of R. Stanley Smith & Associates, with temporary office accommodation at 359, Strand, London, W.C.2 (telephone : Temple Bar 5647).

On and after January 1st Messrs. Alexander Gothard & Partners, consulting engineers, will be at 8, Adam Street, Adelphi, London, W.C.2 (telephone Temple Bar 4688).

Mr. C. B. Lewis, associate director of Oliver J. Nilsen & Co. Pty., Ltd., Melbourne, who has recently completed twenty-five years' service with the company, is visiting this country early in 1947. Mr. Lewis spent his boyhood in Taunton, Somerset, and as a young man was assistant engineer at the Taunton Electric Light Works. After a few years of wheat farming and cattle droving in Australia, he gravitated back to the electrical industry. Although the primary object of Mr. Lewis's visit will be to see his family, he will make a number of contacts in the electrical industry.

Mr. C. B. Lewis

Mr. J. H. Greenwood, who is at present with the Willesden Corporation, has been appointed deputy electrical engineer and manager of Walsall Electric Supply Department.

A number of new appointments and promotions have been made to the staff of the Portsmouth Corporation Electricity Department, under Class J of the N.J.B. schedule. These include Mr. J. G. Thomas, who has been appointed civil engineering assistant (Grade 8), Mr. F. H. Edwards, combustion shift engineer (Grade 8), Messrs. A. H. Cooper and J. C. Parton, district mains engineers (Grade 8), and Mr. E. L. Farrands, assistant shift engineer (Grade 8b).

Mr. E. S. Waddington, M.Inst.W., A.M.I.E. (S.A.), Associate I.E.E., of Philips Industrial (Philips Lamps, Ltd.) has recently been elected a vice-president of the Society of Engineers.

Torquay Corporation Electricity Committee has appointed **Mr. V. E. Fisher,** of Worcester, as assistant district engineer.

Appointments Vacant.—In this issue the Woolwich Electricity Department is advertising for a radio engineer (£446 per annum). Other positions advertised are:—Deputy electrical engineer and manager for Cheltenham (£833); chief technical assistant for Scunthorpe (£640); installation engineers for Southend (£442) and Sheffield (electrical contracting) (£478); lecturer in electrical engineering for the South-East London Technical Institute (£300-£525 plus allowances); and power station superintendent for St. Helens (£681).

Thorn Electrical Industries, Ltd., held their Christmas dance at the St. Pancras Town Hall on December 13th. Over 400 people attended, including members of the staff from the Ferguson Radio factories. **Mr. A. S. Shier,** a director of the company, deputizing for Mr. Jules Thorn who was prevented from attending by illness, made a short speech during which he read a telegram sent to the gathering by the managing director. Mr. H. Weenan, M.C. (in company with Mr. G. A. Shea) then read the text of a reply sent on behalf of the staff, wishing Mr. Thorn a very speedy recovery. The ballroom was gaily decorated, and prizes distributed during the evening included champagne and compacts.

The staff of Falk, Stadelmann & Co., Ltd., held their first post-war dance and social on December 12th at the "Paviour's Arms" Hotel, Page Street, Westminster. This function which signalized the revival of the Veritas-Efesca Social Club also included an excellent cabaret, and despite foggy weather over 200 attended. Those present included **Mr. Gustav Falk,** chairman of the company, and several of the directors.

Obituary

Mr. G. Wüthrich.—We regret to record the death of Mr. Gottlieb Wüthrich, M.I.E.E., general manager and chief engineer of Oerlikon, Ltd., which occurred on December 16th at a London nursing home at the age of sixty-seven. Mr. Wüthrich came to this country in 1899 after obtaining the diploma of the Burgdorf Technical College and serving in the design department, works and testing laboratories of the Ateliers de Construction Oerlikon, Switzerland. Further experience was obtained in Vorarlberg, Scotland, Norway, Sweden, France and Italy.

The late Mr. G. Wüthrich

Mr. Wüthrich was then engaged in the reconstruction of slow-speed vertical steam engines for driving Oerlikon flywheel generators in the Pigeon House generating station of the Dublin Corporation. At the beginning of the century he was associated with the installation and setting

to work of plant in a number of power and convertor stations in London.

In 1903, Mr. Wüthrich became resident engineer, and in 1907 was appointed chief engineer and manager of the Ingenieur Bureau, London. The most important contract was the electrification of the Euston-Watford Line for the London & North Western Railway (now the L.M.S. Railway), which was carried out during the 1914-18 war. Another of Mr. Wüthrich's undertakings was the planning of the works and its hydro-electric plant for the Vigeland Aluminium Works in Norway. In 1921, Oerlikon, Ltd., was formed and Mr. Wüthrich became general manager and chief engineer.

Mr. R. N. Vyvyan.—We regret to announce the death of Mr. Richard Norman Vyvyan, formerly engineer-in-chief of the Marconi Co. In recent years he had been living in retirement at Falmouth, and it was there that he died on December 14th, at the age of seventy.

Mr. Vyvyan joined the technical staff of Marconi's in 1900, and after a short period at the Chelmsford works and at the wireless station at Dovercourt, was one of the party who selected the site of the station at Poldhu, in preparation for the first transatlantic experiments, and he supervised the erection of the station. Later he held the position of managing engineer in Canada for the Marconi Co. Returning to this country from Canada in 1908, he was made superintending engineer of the company.

After his return to England he started upon the erection of stations for the original Imperial wireless chain which were never completed owing to the outbreak of war in 1914. After that war Mr. Vyvyan was intimately connected with Marconi and Franklin in the development of the short-wave beam system, and he was responsible for the construction and engineering design of the Imperial wireless stations. Mr. Vyvyan was appointed engineer-in-chief of the Marconi Co. in 1923 and consulting engineer in 1932. From 1930 till 1932 he also held the position of joint engineer-in-chief of Imperial & International Communications, Ltd. (now Cable & Wireless, Ltd.). He retired in 1936.

Professor P. Langevin.—The death occurred in Paris last week of Professor Paul Langevin, the eminent French physicist. In his work on radio-activity, X-rays and the electron which extended over a period of about fifty years he was associated with the Curies, J. J. Thomson and Rutherford. Professor Langevin was seventy-four.

Mr. J. M. C. Field.—We regret to record the death of Mr. J. M. C. Field, managing director of the Borth & Ynyslas Electric Supply Co., Ltd., and director of the Towyn, Aberdovey & District Electricity Supply Co., Ltd., which occurred on December 18th, at the age of forty-six, after a short illness.

Mr. W. A. Potts, chief electrical engineer of the Power Production Department, State Electricity Commission of Victoria, died recently at the age of fifty-five. He was responsible for the electrical design work of the Newport power station and the preliminary electrical designs for the Kiewa hydro-electric project.

Mrs. J. E. Edgecombe.—We learn with regret of the death on December 19th, at the age of eighty, of Mrs. Dorothy Lucy Edgecombe, the wife of Mr. J. E. Edgecombe, who was for many years borough electrical engineer of Kingston-on-Thames and later a director of the Stearn Electric Co., Ltd.

Wills.—Mr. S. V. Williams, chief metallurgist, G.E.C., Wembley, who died on August 8th last, left £7,602 gross, with net personalty £5,782.

Mr. M. J. Chapman, electrical contractor and founder of the Electric Installation Co., Wimbledon, S.W., who died on September 17th last, left £4,981 gross, with net personalty £4,953.

Ordnance Factory Conversion

Manufacture of Electrical Apparatus

BESIDES indicating the contribution of the Royal Ordnance Factories to the war effort, an exhibition now being held at the Carlton Hotel, Pall Mall, London, until January 18th shows how these establishments are now helping to produce fittings and components for the housing drive. Under the stress of war the Royal Ordnance Factories increased from three to 44 and at the peak employed nearly 350,000 people as against under 10,000 in peacetime.

Among the factories now making goods for domestic use is that at Radway Green, Crewe. One of the largest of its kind in Europe, this establishment was during the war engaged entirely in making 20 mm cannon shells and fuzes. Conversion of a 5-acre section to peacetime use began in March and now production has commenced of electric cookers for marketing by Falco Electrical Appliances, Ltd. The models are, of course, of the company's latest peacetime design and will in a few months' time be turned out at the rate of one every five minutes. By about the middle of 1947 production of refrigerators for temporary houses will commence under the supervision of the Pressed Steel Co., Ltd. At two other factories at Swinnerton and Poole, ceramics are being made, including components for Falco, Jackson and Revo cookers. Negotiations are also proceeding for the manufacture of thermal storage water heaters.

Salaries and Conditions of Service

The National Association of Local Government Officers has asked six London electricity companies whether they would be prepared to participate in a conference to discuss Whitley Council machinery for salaries and conditions of service, and its application to company electricity undertakings.

Production and Export

Industrial Progress at Stake

BRITAIN'S need to export on a scale never previously reached and possible reasons why the output per man-hour was now so much less than it had been during and before the war were the theme of the outspoken address by SIR CLAUDE D. GIBB (chairman, C. A. Parsons & Co., Ltd.) as North-Eastern Section president of the Institution of Production Engineers.

There was much talk of loss of incentive on the part of the workers, the actual producers, but not a word about the managers being tired, stale, suffering from malnutrition, and depressed by heavy taxation; yet nothing could be more dangerous than management fatigue. Sir Claude had recently been in Australia where he found the food so good in variety, quality and quantity that he could not remember whether it had ever reached such excellence at home. Yet no one wanted to work there any more than here. Food could certainly not be blamed for the industrial unrest and "go slow" tactics that were so evident in Australia.

Was loss of pride in one's home, products of manufacture and country nearer to the root cause of low output? He found it difficult to believe that pride could not be restored; or that fear of unemployment and old age, which no longer existed, was necessary to spur any Britisher to give his employer a fair return for a fair day's pay.

Alarming Rise of Costs

During 1933-46 works costs of electrical engineering plant increased 120 per cent, despite advances in manufacturing methods which prevented the increase being even larger. Costs, prices of materials and wages were still rising at a rate that alarmed anyone who exported a large proportion of his total production.

Blunt talking was needed; unless someone started in the right direction, there would be no one for the masses to follow. The gospel of hard work and why it was necessary must be spread.

Sir Claude's company had adequate export orders for electrical generating plant, but a recent example of competition indicated the "shape of things to come." Tendering for a turbo-alternator to a European country which was a food exporter, his company's price of £123,000 was the lowest British price and lower than Swiss and Swedish tenders, but the order went to Czechoslovakia at £68,000. Coal and steel in Czechoslovakia cost half what they did in England and their workmen were highly skilled and industrious.

Sir Claude had no wish to be a dismal prophet, but facts must be faced. If further industrial progress was to be made, it must be through more utilization of power by every producer to enable more articles to be made per man-hour than hitherto.

Re-examination of production processes at frequent intervals would show where further economies could be made, while the incentive for the operator to work his machine to its maximum capacity could only come from some form of output bonus, plus restoration of pride of craftsmanship.

Finally, more cheerful factory surroundings would stimulate a man's pride in his work and his desire for a brighter home, producing a cumulative effect.

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Motor Inquiries

AS an engineer responsible for the correct interpretation of purchasers' specifications for fractional-H.P. electric motors, I have noticed during the past few years an increasing tendency to specify "synchronous" motors. The fact often emerges after a few discreet questions that for only a proportion of such inquiries are synchronous motors actually required, and some inquiries even specify 50-cycle synchronous motors running at 1,420 r.p.m.

These inquiries usually emanate from designers and others better versed in the characteristics of their own machines than of the motors which drive them, but a little publicity given to this increasingly common error may do a little good.

Harrow. H. G. POXON.

Heat Pumps

THE recent discussion on this subject indicates that heat pumps may have great scope in the near future. One method would be to heat the boiler feed water and to use the refrigerated water to help cool the condenser: or it could be used to cool the air which takes the heat from the generator. This might be of service in hot climates.

Tynemouth. C. TURNBULL.

Switches in Bathrooms

A NOTE at the end of I.E.E. Regulation No. 1002 refers to the desirability of providing a ceiling switch operated by a non-conducting cord in a bathroom in place of a switch on the wall. Would it not make for greater safety if the Regulation specified that only ceiling switches were to be fitted in bathrooms, kitchens and similar places?

Dorchester. STANLEY ROGERS.

Boiler Plant

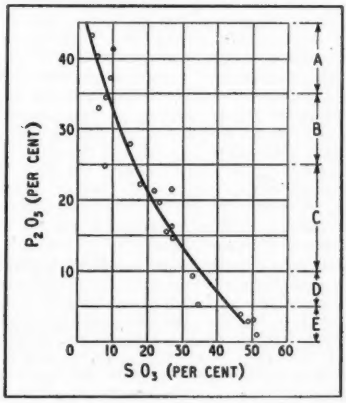
External Deposits and Corrosion

AN Interim Report has been published by the Boiler Availability Committee (chairman, Mr. M. H. Adams) on External Deposits and Corrosion in Boiler Plant. In this Bulletin, No. MC/153, which is addressed more particularly to power-station engineers, the Committee has co-ordinated investigations carried out for over seven years by the British Coal Utilization Research Association, the Fuel Research Station of the Department of Scientific and Industrial Research, Babcock & Wilcox, Ltd., E. Green & Co., Ltd., International Combustion, Ltd., the County of London Electric Supply Co., Ltd., the Lancashire Electric Power Co., and the London Power Co. Ltd.

Deposits are divided into two main groups —high temperature (furnace, superheater and boiler proper) and low temperature (economizers and air heaters). In the first group with stoker-firing are the hard deposits (distinguishable microscopically), i.e., birdnesting, bonding and phosphatic. The first named is found most frequently on the first bank of tubes when set low over the fire, as in older boilers or in boilers having a high superheat temperature that calls for very high gas temperatures at the furnace outlet; generally it is the only troublesome type of deposit in pulverized-fuel boilers. Gas temperatures in the furnace or superheater should be as low as economically possible. Unlike the two other high-temperature deposits it resembles coal ash in composition and softening temperature and consists of sintered (surface-softened) particles or of particles fused on the tube.

Inlet to pendant superheater (right) after 718 hours

Bonded deposits, which occur mostly on superheater tubes and are probably the most serious in their effect on availability, are a result of a matrix produced from the sodium potassium and sulphur in the coal. They differ from birdnesting in containing from 10 to 50 per cent of water-soluble



Relationship between phosphate and sulphate contents of economizer deposits as it affects cleaning
A=Very little affected by steaming. B=Partially softened by steaming C=Softened by steaming. D=Removed by spray and wash. (Wetting agent used.) E=Removed by water washing.

matter composed of the sulphates or bi-sulphates of sodium and potassium, the bisulphates being the more harmful, but these are operative only when the ratio of sulphur to chlorine in the coal is high. Temperatures of flue gas in the regions affected are high enough to cause sintering of the cement but not to soften the fly-ash.

Phosphatic deposits are bound together chemically and by digestion of fly-ash particles, which are attached by phosphorus compounds. As few British coals contain sufficient phosphorus that can be released during combustion to cause deposits, this trouble is not widespread, but when it occurs it is serious.

Nature of Low-Temperature Deposits

Low-temperature deposits on economizers mainly result from the presence in the gas of free sulphuric acid and are harder the higher the feed-water temperatures; they are composed of fly-ash and condensed substances and products of chemical reactions after deposition. Generally the higher the phosphate content the lower is the sulphate (and vice versa) and the less soluble is the deposit which increases the difficulty of removal. Troublesome deposits and corrosion in air heaters are all characterized by the presence of free sulphuric acid. They have two distinct causes: First, the temperature of the heating surfaces may fall to that of the water dew-point of the flue gases, due to too-cold inlet air or to unequal distribution of gas and air flows; secondly, at higher temperatures, 200 to 300 deg F, small quantities of H_2SO_4 may raise the dew-point of the gas to upwards of 300 deg F, coal of high sulphur content.

The mechanism of deposit formation is discussed with reference to analytical and physical determinations, results of combustion experiments the, significance of sulphur oxides and the effect of fine dusts and "smokes." Studies at thirty-six power stations have shown that deposit-forming characteristics are shown by sulphur, phosphorus and chlorine and that the relative proportions of these are approximately constant for any given coal field.

With high-sulphur coals (3 or 4 per cent), air-heater corrosion can hardly be avoided at present temperatures. Much of it can be avoided, however, by re-circulation of heated air or parallel flow for air and flue gases. Experiments to prevent the catalytic formation of sulphuric acid in superheaters are proceeding.

Phosphatic deposits cause more trouble where combustion conditions are strongly reducing and fuel-bed temperatures are high; high-phosphorus coals (more than 0·04 per cent) are less harmful on travelling-grate than on retort-type stokers. They should probably be burned in specially designed boilers. Fundamental research has indicated that bonded deposits particularly can be beneficially affected by introducing fine dusts of silicon, zinc oxide or magnesium in the gas, but it is not yet certain whether equally efficacious hydro-carbon "smokes" can be liberated from the fire bed.

Deposit troubles can be minimized by providing facilities, including good access and means of draining the sludge after washing, for cleaning the plant both on and off load (see "Methods of Cleaning Modern Stoker Fired Boiler Plant," MC/101 of the Boiler Availability Committee). Temperatures of leaving gases should be no higher than is required for economical superheating of the steam. Turbulence of gases in the furnace reduces high-temperature deposits. By fitting a diaphragm across the furnace below the grate, closer control of combustion of difficult coals has been obtained. The Report is well illustrated by typical examples of deposits.

E.D.A. Activities

THE second of the series of E.D.A. South-East and East England Area lecture-meetings was held at the Croydon Electricity Showrooms. With an attendance of 140 sales assistants, the meeting was again a highly successful one. The subject on this occasion was "Electric Water Heating Development," and the lecturer was Mr. P. Honey, who dealt with development during and since the war. The different types of water heater were explained and special attention was paid to the avoidance of common installation errors which result in circulating currents of water being set up, and consequent abnormal pipe losses and waste of electricity. The value of the load to the electricity supply industry and the fact that electricity could solve any water heating problem were stressed. A discussion followed and the proceedings terminated with a tour round the showroom and office premises.

Recently a programme of films which, in each case, featured "Cooking for the Million" was presented in London on December 12th to over a hundred members of the South-Eastern Branch of the Institutional Management Association. At the end of the film show the Area Officer gave a short talk on "The Economic Aspects of Electric Catering."

Pulverized Coal Firing

Development in Great Britain

THIS country has been slow in adopting pulverized coal firing in electric power stations. Only within the last ten years have boiler units in home stations attained to a size which, on that account, warrants the burning of fuel in suspension rather than on stoker grates. When fuel conditions are favourable, travelling grates compete at any evaporations up to 250,000 lb per hr and retort-type stokers are in some cases employed for slightly larger outputs.

A paper which MR. C. H. SPARKS (chief engineer, Babcock & Wilcox, Ltd.) read in London last week at a joint meeting of the Institutions of Electrical and Mechanical Engineers shows that the amount of coal consumed in powdered form in power stations in Great Britain increased from 900,000 tons in 1930 to 4·4 million in 1945, or 20 per cent of the total; it is expected to be 10 million tons, or 35 per cent, in 1950. The average capacity of the boilers is 225,000 lb per hr, the largest units in service being of 364,000 lb per hr. So far as can at present be foreseen units are not expected to exceed 540,000 lb per hr in size.

The real reason for the sudden increased utilization is that boilers fired with pulverized coal have a proved reliability at least as satisfactory as that of the best stoker-fired units and, in addition, when well designed they may be kept commercially clean by the use of soot blowers only between annual overhauls.

Freedom from Bonded Deposits

The fortuitous freedom from the formation of bonded deposits on the boiler superheater and economizer pressure parts is one of the most important of the many advantages claimed for pulverized coal. That statement represents operating experience in Great Britain at moderate ratings, although air heaters are not immune. The result is that a smaller margin of standby plant is generally acceptable. A number of new installations are being designed as units with a single boiler delivering steam to one turbo-generator of 30,000 or 50,000 kW.

Furnaces with a dry-ash bottom are preferred in British power stations because the coal is bituminous, but ash is a drawback with pulverized fuel both inside and outside the furnace. Therefore those who have been longest associated with this method view with misgiving its selection as the means of burning all fuel which cannot be disposed of in other ways.

The tendency to divert a large proportion of the poorest quality coal to new power stations is viewed with alarm. Owing to the variable quality of the ash and the limitations imposed by its presence in increasing quantity, boiler units must be moderately rated to maintain satisfactory availability. Combustion rates must be controlled to obviate slagging and " bird nesting " with unfavourable fuel, which necessitates the provision of larger furnaces than might otherwise be needed.

For boilers exceeding 400,000 lb per hr rating a strong case can be established for the use of specially selected fuel; alternatively, liquid ash removal may be employed, but in either case disposal of the fine flue dust from the arrestors frequently proves to be difficult as well as expensive.

Cyclone Furnace

With a view to solving this serious problem and to offset the disadvantages of variable ash characteristics, the cyclone furnace has been evolved as the result of patient research by the Babcock & Wilcox Co., of New York, which has been experimenting for more than fifteen years with the firing of crushed, as opposed to pulverized, coal with the object of reducing the whole of the ash to the fluid state. By this means it can be tapped and quenched to the solid state for disposal, thereby obviating the necessity for cleaning the boiler surfaces externally or providing means of protection for induced-draught fans, incidentally also eliminating all fly-ash and carbon losses.

Such a boiler, of from 150,000 to 180,000 lb per hr capacity, has been in operation in the Calumet station of the Commonwealth Edison Co. since 1944 without trouble. There is nothing of special importance in the design of the boiler itself, but the cyclone (8 ft in diameter and length) and the arrangement of the furnace (only 9 ft wide between walls) are quite novel in every respect. Details and drawings are included in the paper.

Crushed, as opposed to powdered, coal

is likewise utilized for overfeed firing on to forward-moving grates with Babcock-Detroit "jet" spreader stokers (see "Kearsley Extensions," *Electrical Review*, October 25th), a method which is claimed to compare favourably with any other within its yet undetermined range of size.

A considerably increased output of dust fuel seems probable as the result of greater mechanization of coal mines, so that pulverized-coal-fired boilers will always be in demand to dispose of it. The whole subject is at the moment under review by a committee upon which are represented the coal and electricity supply industries as well as the manufacturers of appropriate equipment and furnaces.

Now that boilers have reached (in some cases passed) the capacity at which the firing of coal by other methods is causing anxiety, attention is being focused upon the use of pulverized coal, presumably because it is generally considered to possess advantages over all other systems.

Safeguards Against Fire

New Research Organization

THE Government, through the Department of Scientific and Industrial Research, has decided to establish a comprehensive Fire Research Organization, jointly with the Fire Offices' Committee. For purposes of day-to-day administration it will operate as a normal organization of the D.S.I.R. A Fire Research Board has been appointed jointly by the D.S.I.R. and the F.O.C. The chairman is Lord Falmouth, Companion I.E.E., M.I.Mech.E., and the members include Dr. S. F. Barclay (Mather & Platt, Ltd.), Dr. P. Dunsheath, C.B.E., M.I.E.E. (W. T. Henley's Telegraph Works Co., Ltd.) and Professor D. T. A. Townend, D.Sc., F.R.I.C. (director, British Coal Utilization Research Association). The members of the Board serve in their personal capacity and not as representatives of any organization to which they may happen to belong.

Lord Falmouth

The Fire Research Organization is a joint body in which an industry and the Government are partners, the cost being shared equally between them. The organization will be responsible for the conduct of research on all aspects of the prevention and extinction of fires, on the safety of life in fires and the mitigation of damage, except that on the fire resistance of buildings it will collaborate with the Buildings Research organization of D.S.I.R. where much research on this subject has already been done. A fire research station will be jointly established. The capital cost is likely to be of the order of £75,000 to £100,000 and the ultimate annual running cost up to £50,000, both shared equally between the D.S.I.R. and the Fire Offices' Committee. As part of their contribution to the capital cost, the F.O.C. will transfer its fire testing station at Elstree to the Government.

The broad subjects on which research will be conducted are fire prevention, fire fighting, fire protection of buildings and other fire hazards, e.g. ships, aircraft and special industrial hazards.

The Fire Offices' Committee, which is an association of fire insurance companies, has for the last 150 years taken a leading part in the encouragement of fire protection in this country and in 1932, the Committee set up the testing station at Elstree (mentioned above) to provide facilities for fire resistance tests required, not for fire insurance purposes, but to furnish essential data to the central and local authorities and industry generally in connection with the construction of buildings. The station was immediately made available to the D.S.I.R. for research work.

Now the Fire Offices' Committee has decided to establish the "Fire Offices' Committee Fire Protection Association" and to undertake fire research jointly with the Department of Scientific and Industrial Research through the formation of the Fire Research Board.

Fire Grading of Buildings

Underlying principles of fire protection in buildings are reviewed in "Post War Building Studies No. 20—Fire Grading of Buildings" which is the work of a joint committee of the Building Research Board and of the Fire Offices' Committee (H.M. Stationery Office, 1s. 6d. net). Fire grading assigns precautions to a building in order to relate safety to fire hazard. This report covers primarily the construction of buildings (according to the fire load carried) so as to avoid collapse and to minimize risk of fire spread. Means of escape and fire-fighting installations will be dealt with in succeeding parts. Fire load is the number of B.Th.U.'s which could be liberated per sq ft of floor area by the combustion of the building and its contents. An appendix gives a list of the fire-resistance gradings of walls and floors and protected steelwork.

The Power Situation

Shortage Until 1949 or 1950

THERE is no physical possibility of re-establishing the proper balance between generating plant and production in this country before 1949 and probably 1950, and the next two winters are going to be even more difficult than this. Making this statement last week, Mr. Harold Hobson, chairman of the Central Electricity Board, added, however, that if the Government said tha generating plant was to have first call on labour and materials it should be possible to overcome difficulties by 1949.

Announcing the introduction of an extension of the broadcast warnings of electricity cuts, Mr. Hobson said that they would be given between items in the Light Programme and would be of use particularly to firms which used " Music While You Work." He suggested that factories should arrange to have someone listening all the time during the critical period just before 4 p.m. and during the morning peak.

Plant Extensions Delayed

Mr. Hobson stressed again that the present cuts had nothing to do with coal shortage but said that possibly they might be in difficulty from that cause in the New Year. He explained that adequate generating plant was not available because in 1941 the Government deliberately banned the production of new generating plant so as to ensure that sufficient armaments should be available. The demand for electricity had continued to grow—during the past few weeks it was at least one million kW higher than at the same time last year—and we were now paying the price. Before the war it took three years to build a generating station: to-day, because of shortages of materials and labour and through a falling-off in production, it was taking four years or longer. There were still bottlenecks in production and of the 900,000 kW of plant planned for service by the end of this year only 200,000 kW had been put into commission. He doubted whether more than half of the programme would be completed by the end of February.

Domestic consumers, who accounted for about 30 per cent of the total consumption (industry took 60 per cent and public lighting, shops, hospitals, etc., 10 per cent) could alleviate the position and reduce cutting off supplies if they switched off fires, cookers and water heaters during peak periods. The C.E.B. had been pressing the Government to control the manufacture of radiators (of which half a million had been sold during the first half of 1946) and other appliances and he had reason to believe that the supply of materials for manufacturing these articles was at last to be restricted.

The use of mobile power stations suggested by Mr. Shinwell recently was only a " fleabite." If it were thought proper to cease all exports of generating plant—they accounted for not more than 10 per cent of the total production—it would be possible to speed up the provision of plant here. It was, however, important to preserve the overseas market and the C.E.B. had never made any request to the Government to ban exports. Generating electricity was a long-term problem and it would be useless to try to cure the present trouble by taking machines about to be shipped abroad. The civil engineering work alone accupied two or three years.

Ministry of Supply Explains

Questioned about Mr. Hobson's statement that the Government had arranged to reduce drastically the output of electric fires, etc., for the home market by the control of raw material, a Ministry of Supply official told us that the Ministry was not aware of any request to reduce the number of electric fires being produced. As from the beginning of November the licensing of the manufacture of all domestic appliances was cut down because of the shortage of raw materials and the allocation of these appliances would continue to be restricted for some months.

The productive capacity of the industry is greatly in excess of essential requirements for electric fires and in view of the present supply situation raw material allocations are already not so great as formerly. The Ministry expects to meet all estimated essential requirements for the production of such appliances as fires, cookers, washboilers and immersion heaters. The approximate average monthly production of electric fires has risen from 115,000 in 1937 to 220,000 in the third quarter of 1946.

Rationing Not Contemplated

Last week the Ministry of Fuel and Power stated that there was no foundation for press reports that plans had been worked out by the Ministry for an electricity rationing scheme or that private consumers would be subjected to some form of supervision to prevent waste.

The Birmingham Electric Supply Committee has suggested to the Minister of Fuel and Power that arrangements should be made for factories to close on one day a week in " staggered " order; that penalties should be instituted for domestic waste of fuel; and that the sale of electric heating apparatus should be prohibited. The Committee says that at the present rate its coal stocks will be exhausted by the end of January and unless the position is ameliorated a 25 per cent power cut will be necessary.

PARLIAMENTARY NEWS

By Our Special Reporter

IN the House of Commons last week Mr. Erroll asked the Minister of Works whether he intended to encourage the use in Government buildings and housing schemes of the universal domestic electric plug and socket recommended by his Electrical Installations Study Committee in Building Studies No. 11 ; and when the relevant British Standard Specification would be published.

Mr. Tomlinson said that the British Standards Institution had prepared a draft specification for the universal domestic electric plug and socket which had been circulated to all interested parties for observations. Until the specification was issued in final form no decision could be made as to its adoption. Manufacturers were proceeding with development work, pending the issue in the near future of a British Standard Specification. Owing to the necessity for re-tooling, however, substantial supplies were not likely to be available for about twelve months.

Engineering Advisory Council

In answer to Sir R. Young, Mr. Wilmot said that, following the discussion which he had had with the engineering trade unions, he had decided to set up an Engineering Advisory Council to provide him a means of consultation with employers and workers on matters of general concern in the engineering field. Matters normally handled by the joint organization of employers and trade unions in connection with wages and conditions of employment were excluded. The engineering industries for this purpose would comprise mechanical, electrical and radio engineering, but not shipbuilding or the iron and steel industry, which fell within the purview of the Iron and Steel Board. The Council would consist of trade union and employer members with himself as chairman.

Electricity Bill

On December 20th the Minister of Fuel and Power introduced the Electricity Bill which was read a first time. The Bill provides for " the establishment of a British Electricity Authority and area electricity boards and for the exercise and performance by that authority and those boards and the North of Scotland Hydro-Electric Board of functions relating to the supply of electricity and certain other matters, for the transfer to the said authority or any such board as aforesaid of property, rights, obligations, and liabilities of electricity undertakers and other bodies, to amend the law relating to the supply of electricity, to make certain consequential provision as to income-tax."

E.I.B.A. Home

LAST week we referred to the gift of Broome Park, Betchworth, Surrey, to the Electrical Industries Benevolent Association by Mr. and Mrs. Joseph Cunning. A brochure which we have now seen shows that the estate possesses a wide variety of domestic and scenic amenities which will make it ideal for its new purpose.

The Georgian mansion (a view of which is reproduced) contains four large reception rooms, sixteen bed and dressing rooms and four bath-rooms, besides other apartments. It has a central heating system and is up-to-date in every respect. The 25-acre grounds include two lodges, a number of cottages, a park, woodland and a chain of lakes.

It is proposed for the time being to use the existing buildings to house the Association's beneficiaries. Later, small bungalows may be erected in suitable spots, care being taken not to mar the character of the estate.

A view of Broome Park showing the east front of the house

COMMERCE and INDUSTRY

Electronic Instrument Manufacture. Assistance for Students.

FOURTEEN member firms of the Scientific Instrument Manufacturers' Association of Great Britain, Ltd., have formed an Electronics Section. The first chairman is Capt. A. G. D. West, director of Cinema-Television, Ltd., and the companies forming the Section are:—Baird & Tatlock (London), Ltd., Baldwin Instrument Co., Ltd., Cinema-Television, Ltd., Adam Hilger, Ltd., Henry Hughes & Son, Ltd., Kelvin, Bottomley & Baird, Ltd., Marconi Instruments, Ltd., Mullard Wireless Service Co., Ltd., Scophony, Ltd., Short & Mason, Ltd., the Sperry Gyroscope Co., Ltd., Sunvic Controls, Ltd., Taylor Electrical Instruments, Ltd., and Taylor, Taylor & Hobson, Ltd. One of the main objects of the Electronics Section will be to further and improve the manufacture of British electronic instruments and apparatus. It will encourage the design and manufacture of British electronic apparatus, both in research and industry, thus helping production at home and entering world markets abroad where there are, at present, first-class opportunities for British goods.

Electric Torch Batteries

The Board of Trade, in consultation with the Central Price Regulation Committee, has made the Electric Torch Dry Batteries (Maximum Prices) Order (S.R. & O. 1946 No. 2100), permitting increased maximum prices for certain types of home-produced electric torch dry batteries. The Order came into force on December 23rd and copies (price 1d.) can be obtained through any bookseller or newsagent or direct from H.M. Stationery Office.

Sulphuric Acid Prices

In the Control of Sulphuric Acid (No. 3) Order, 1946 (S.R. & O. 1946 No. 2033, Stationery Office, 1d.), the additions to the basic price chargeable for sulphuric acid by a United Kingdom producer are specified in a schedule. This replaces the method of issuing Directions under the No. 2 Order and at the same time the additions are revised.

Unwrought Copper and Zinc

The Ministry of Supply has revised the licensing procedure for the acquisition of unwrought copper and zinc and copper wire rods. Applications for licences to acquire unwrought copper and zinc will in future only be granted if accompanied by the following signed declarations: (1) "We certify that the quantity requested on the accompanying application is needed to cover orders for our products, and that in the case of applications for virgin metal full allowance has been made for our expected intake of scrap." (2) "We certify that, in respect of unwrought metal, our existing stocks plus our outstanding purchases, plus the tonnage now being applied for, will not exceed six months' consumption at our average monthly rate of consumption in September and October, 1946." Applicants for licences to acquire hot rolled copper wire rods are not required to furnish the second of the above declarations. The issue of a rod licence, however, does not guarantee that the holder will be able to place contracts against the licence, either with rod manufacturers or the Directorate of Non-Ferrous Metals.

Electrical Machinery Prices

In this issue the Associated Dynamo & Motor Manufacturers, comprising sixteen concerns, announce that outstanding dynamo and motor price lists will be cancelled on and from January 1st. Details of new prices are obtainable from inquirers' usual suppliers.

Physical Society's Exhibition

Instead of holding its annual exhibition of scientific instruments at the beginning of the year as has been customary, the Physical Society has decided to arrange the display from April 9th to 12th. It will be at the usual place—the Imperial College, South Kensington.

Civil Service Appointments

Particulars will be found in our advertisement pages to-day of the Civil Service Commissioners' special competition for appointments as assistant engineer (new style), male, in the Post Office Engineering Department, and assistant traffic superintendent in the Telephone Department of the G.P.O. Approximately 100 vacancies in each grade will be filled by examinations spread over a period of two or three years.

B.T.H. Educational Grants

To commemorate the jubilee of the British Thomson-Houston Co., Ltd., this year the directors arranged for a number of financial grants to be awarded over the next three years to assist employees of at least ten years' service in the education or training of their sons or daughters of school-leaving age or over. These awards will be made where the circumstances merit such additional assistance, and it is not intended that they should be confined to engineering training, as the B.T.H. apprenticeship and fellowship schemes meet nearly all such requirements. Under the new Education Act, State and county scholarships should be available for all pupils capable of taking advantage of a university or other collegiate

training, but it is possible that in the next three years there may be cases where this is not fully available although the candidate may have been accepted for admission to a college. The scheme is intended to assist such persons.

In addition to university or technical college education, it is intended that assistance shall be given for other forms of training such as in commercial or art colleges; colleges of music; in chartered accountancy; agriculture, etc. Courses of advanced study may be undertaken in such subjects as medicine, dentistry, zoology, physical training, municipal engineering, physiotherapy, architecture, auctioneering, bacteriology, physics, mathematics, and many branches of teaching.

Following the decision to initiate this scholarship scheme, a committee was appointed under the chairmanship of the company's chief electrical engineer to consider applications. Of the total number received, 28 per cent were outside the scope of the scheme, 40 per cent were deferred as no expenditure was involved during the present academic year, and 32 per cent were considered for awards. In 20 per cent of the cases, grants were made up to £100 each for 1946-47, and where expenditure is involved next year or the following year the granting of awards will be continued. Recipients of the grants are employed at various works and offices of the B.T.H. Co. In general, the grants are additional to awards being received from other sources, but in several cases the grant made by the company provides the only assistance being received by a parent.

Infra-Red Paint Stoving

To speed up the production of water heaters of the lagged storage type, Johnson & Phillips, Ltd., have recently installed a "Metrovick" infra-red "oven" capable of paint stoving cylindrical outer cases from 1½ to 30 gal. capacity. This method, which completely paint stoves each body in five minutes, is a considerable improvement on the older methods of drying. Ninety-six infra-red lamps are used, with a total loading of 24 kW. In addition to saving time, this plant occupies the minimum floor space (12 by 4 by 13 ft) and is readily adapted to any change in factory layout.

Reinstatement and Pensions

An employee's appeal that by not admitting him to the company's co-partnership and pension schemes the Mid-Southern Utility Co. had failed to carry out the decision that he should be employed on terms and conditions such as he enjoyed before joining the Army came before the Reinstatement Committee at Worthing recently. The employee, Mr. L. A. Brown, said that when he joined up he was paid out of the schemes, but not at his request. On returning he notified an official that he was ready to pay into the schemes the money that had been paid to him, but it was pointed out that he would have to serve the company with satisfaction for twelve months before he would be eligible to rejoin. Mr. Ricketts, for the company, said that membership of the schemes was a privilege and not a condition of employment. The company was prepared to receive him into the schemes at the appointed time. The Committee unanimously found that the company had fulfilled its obligations under the Act.

Commercial Travellers' Benevolence

Accounts for the past year for presentation at the annual meeting to-morrow (Saturday) show that the receipts of the Commercial Travellers' Benevolent Institution amounted to about £16,000 and the payments to a similar amount. The balance in hand rose from £4,230 to £4,644 and the investments by £2,000 of 3 per cent savings bonds.

Electric Hammer Fatality

An inquest was held at Poplar on December 17th on S. H. Doyle, a builders' labourer, who received a fatal shock when using a portable electric hammer for chasing walls in a block of flats in course of construction. Evidence was given by Mr. J. L. Wood, H.M. Electrical Inspector of Factories, that the cable had been partly pulled out from the handle of the hammer, and that the insulation of one of the current carrying conductors had become punctured due to a sharp edge at the point of entry into the switchbox. Although the earth continuity of the flexible cable was unbroken, the earthing of the switch socket from which it was supplied was unsatisfactory. A temporary earth connection had been made to a length of steel conduit driven about 24 in. into the ground, which when measured was found to have a resistance in excess of 50 ohms. In the course of the evidence it was brought out that artificial respiration was applied for about ten minutes before an ambulance arrived to take Doyle to hospital. A verdict of death by misadventure was returned.

Large Transformer for France

As part of the programme for the development of the French electricity network the British Electric Transformer Co., Ltd. (in association with Crompton Parkinson, Ltd.), has just built a 50-MVA, 150/15/6-kV transformer for the Vendin station of the Société de Transport d'Energie Electrique de la Région du Nord. It is 3-phase 50 cycles, star/delta connected, and fitted with a twin "A" type cooler unit. A special construction provides an end door in the tank to enable the carcase to be removed horizontally as there is insufficient headroom in the site workshop for it to be lifted vertically. The carcase slides into the tank on rails, and is pulled in by a tackle passing through a door at the opposite end of the tank.

The transformer and the twin "A" type

cooler unit are designed to be fitted with bogies, carrying flanged rollers mounted in roller bearings, which enable them to be moved on standard French gauge railway lines, or, by rotating them 90 deg, on the special tracks provided for moving them into their final position on site. The cooling is ON/OFB, the artificial system being controlled thermostatically to come into operation at 50 per cent load. Type LS on-load tap-changing gear provides a voltage regulating range of 30 per cent, plus or minus 15 per cent in twenty steps.

The total weight of the whole unit is approximately 112 tons, and the carcase in the tank weighs 82 tons. This part was transported from the works at Hayes, Middlesex, to the Royal Albert Docks on a 35 ft long 100 ton side girder wagon, with two eight-wheeled bogies, propelled by two 45-ton haulage capacity, 100-H.P. Scammell tractors.

Coventry Apprentices' Association

Mr. F. W. Godden, the electrical engineer and manager, is the president of the Coventry Electricity Department Apprentices' Association which has just been formed. Mr. G. Woodward, one of the twenty-four apprentices now being trained in the Department, is secretary of the Association, the objects of which are to form a link between past and present apprentices, to facilitate discussion of apprenticeship matters and to organize social events and visits of educational value.

Situation in Poland

At the recent Congress of the General Technical Federation in Poland, the British Engineers' Association was represented by Mr. N. Neville, a member of the Association's Export Committee. On December 18th at Charing Cross Hotel, Mr. Neville spoke of some of the impressions gained during his visit. He said that the conference was held to discuss a three-year plan for the reconstruction of Poland. That country had suffered severely during the war and had lost about eleven million people. A large proportion of this number were Jews who were the chief distributors, and this had had a serious effect on Polish industry. In addition to the loss of man-power, 40 per cent of the railway facilities had been destroyed, bridges had been blown up and the majority of the passenger wagons had disappeared. Transport was one of the main handicaps to industrial recovery.

The principal industry of Poland was agriculture, the number of workers in which had fallen by about eight million. Poland had lost two-thirds of her oil-bearing territory to Russia, but had gained coalfields in Silesia. The great need of Poland to-day was capital equipment for the reconstruction of her industries. Mr. Neville thought that much could be done on an exchange basis by this country in meeting this need. Poland was prepared to exchange food and coal for equipment. The three-year plan provided for the re-equipment of all her industries, and included plant for power stations and for her iron and steel industries.

Belgian Electrical Trade

During the first half of 1946 Belgian imports of electrical machinery apparatus, accessories and spares were valued at 409,083,000 fr. and exports of such goods at 129,911,000 fr. Switzerland was a notable supplier of electrical goods and Holland of certain descriptions, while Spain appeared as a customer.

Film Studio Lighting

Since the end of the war the General Electric Co., Ltd., has designed a complete new range of film studio lighting equipment, and the first deliveries were recently made at the newly-opened Southall Studios of Alliance Film Studios, Ltd. Mr. James Carter, managing director of these studios, has placed large orders with the G.E.C. The equipment delivered so far includes fifty 2-kW incandescent units, twelve single light broadside units with diffusers, snoots and stands, and eight 5-kW incandescent units. All these units are equipped with " Osram " lamps.

First consignment of the new type of G.E.C. film lighting equipment being carried into the Southall Studios

Staff Magazine's Hundredth Issue

The Christmas issue of " 600," staff magazine of George Cohen, Sons & Co., Ltd., and associated companies, celebrates a double

anniversary. It is both the hundredth issue and the twenty-first birthday of the publication. The current issue returns to normal format for the first time since the war and includes, as a new feature, a special staff supplement. There is a pictorial feature humorously illustrating the very early days of the group.

Cable and Wireless Transfer

Mr. Dalton announced in a written reply to a question that he had fixed January 1st next as the date upon which the balance of the shares of Cable & Wireless, Ltd., would pass into the hands of the Government. As from that date there would be a new board of directors with Sir Stanley Angwin (engineer-in-chief of the G.P.O.) as chairman and Mr. John Innes, C.B., B.Sc., M.I.E.E., as managing director. The other members were Maj.-Gen. L. B. Nicholls, Mr. A. Black and Mr. C. N. Gallie, the last two being part-time members. There might be a further part-time member.

Threatened Power Stoppage

At the end of last week representatives of works committees in some of the London power stations informed their unions that unless the unions did something by December 31st to secure increased wages and improved conditions, including a 40-hour week, there would be a complete shut-down of the London power stations. The men complained that the unions had not proceeded rapidly enough with negotiations. In reply, the representatives of the unions said that a meeting to discuss these matters had been called for December 30th and that no good purpose could be served by "direct action."

House-Building Committee

As from December 30th, the address of the organizing secretary (Mrs. M. Pleydell-Bouverie) of the House-Building Industries' Standing Committee will be 4, Manchester Square, London, W.1 (telephone: Welbeck 1356).

Electricity Board for Northern Ireland

The head office of the Board is now at Danesfort, 114, Malone Road, Belfast (telephone 68211; telegraphic address: Norelect, Belfast).

Trade Announcements

T.M.C.-Harwell (Sales), Ltd., are removing to 37, Upper Berkeley Street, London, W.1 (telephone: Paddington 1867) and the removal will be completed by January 13th.

Mr. G. F. Sargent, buyer of Radio Transmission Equipment, Ltd., has been appointed purchasing agent for Philips Transmission, Ltd., Brathway Road, Wandsworth, S.W.18.

We are informed by the Cobra concern, of Paris, whose process of re-impregnation in situ can be applied to increase the life of wood poles, that its affiliated company, Cobra Wood Treatment, Ltd., will commence operations in Great Britain as from January 1st, and will be responsible for business in Great Britain, Ireland and the Colonies. The temporary address is St. Mary's, Blackmore End, Wethersfield, Essex (telephone: Shalford Green 315), and the manager is Mr. H. R. Wolfenden, lately contracts superintendent with the Britannic Electric Cable & Construction Co., Ltd.

Electrical Exports Rise

Figures of overseas trade for November show that there was a further rise in exports of electrical goods and apparatus. Details of the trade will appear in next week's issue.

Calendars and Diaries

The calendar of Johnson, Matthey & Co., Ltd., has daily slips, each of which bears a quotation, mounted on a tastefully designed card.

Ferranti, Ltd., has sent us a useful engagements pad in a pleasing blue leatherette cover. Each weekly sheet has also a calendar for the preceding, current and following months.

The calendar of Technical & General Advertising Agency, Ltd., has monthly sheets with bold figures.

Trade Marks

THE following applications have been made for the registration of trade marks. Objections may be entered within a month from December 11th:—

DELAFLEX. No. 634,035, Class 9. Insulated electric conductors. Also No. 634,036, Class 17. Electrical insulation material.—De la Rue Plastics, Ltd., Avenue Works, Walthamstow Avenue, London, E.4.

D.K.B. (design). No. 641,366, Class 9. Electrical apparatus and instruments included in Class 9. Also No. 641,367, Class 11. Electric heating, lighting, cooking, drying and ventilating apparatus.—D.K.B. Electric, Ltd., 109, Kingsway, London, W.C.2.

ALCOSA. No. 643,157, Class 9. Electric soldering irons, arc welding apparatus, resistance welding apparatus and blowers.—William Allday & Co., Ltd., 38A, Paradise Street, Birmingham, 1.

DIFFUSALUX. No. 643,733, Class 9. Electrical apparatus and appliances included in Class 9.—Thorn Electrical Industries, Ltd., 105-109, Judd Street, London, W.C.1.

MINWINK. No. 643,932, Class 9. Electric vacuum cleaning apparatus and electric flat irons.—S. T. Meggitt & Son, Ltd., Bourne Chambers, St. Peter's Road, Bournemouth.

SIEMAX. No. 643,969, Class 9. Electric batteries.—Siemens Brothers & Co., Ltd., Caxton House, Tothill Street, Westminster, London, S.W.1.

NICO-CALORAY. No. B641,023, Class 11. Electric fires.—Nico Light Engineering Co., Ltd., 1, Laud Street, Croydon.

ELECTRICITY SUPPLY

Nelson Tariff Decision. Deputation on Severn Scheme.

Billesdon.—SUPPLY TO CAMP CUT OFF.—So heavy has been the load on the wiring at the camp occupied by " squatters " at Thurnby, Leicestershire, due to the use of unauthorized electrical appliances, that the Rural District Council has cut off the supply to the camp until matters are remedied. Repeated warnings to the squatters have all been ignored.

Carmarthen Bay.—PROPOSED POWER STATION.—Notice is given in the *London Gazette* that application has been made to the Electricity Commissioners by the Carmarthen Bay Power Station Co., Ltd., for consent to the establishment of the Carmarthen Bay power station in the area of the Llanelly & District Electric Supply Co., Ltd., the site being partly in the urban district of Burry Port and partly in the rural district of Llanelly. Objections by either of the local authorities or by the owner or lessee of any property within 300 yd of the proposed site must be submitted to the Secretary, Electricity Commissioners, Savoy Court, Strand, London, W.C.2, within thirty days from December 6th.

Dartford.—SALE OF RADIO SETS.—The Electricity Committee reports that four types of " Civic Concord " radio sets have been placed on sale at the showrooms. The sets are offered for sale outright or on hire-purchase terms.

Douglas (I. O. M.).—PAYMENT TO CONTRACTORS.—The Electricity Committee has increased the payment to contractors for cooker wiring from 1s. 10d. to 2s. per ft.

Glasgow.—INSTALLATIONS FOR GAS DEPARTMENT.—The Gas Committee has arranged for the Electricity Department to provide services at the canteen, baths, etc., at Provan chemical works at a cost of £450, and electricity is to be installed in 19 staff houses at a cost of £1,050.

London.—HOSPITAL INSTALLATIONS.—In 1938 the L.C.C. approved an estimate for rewiring Queen Mary's hospital for children, Carshalton. Only the first year's programme costing £2,636 was finished and it is now proposed to complete the work at an estimated cost of £8,500 spread over four years. The final instalment of rewiring the electrical installation at Tooting Bec hospital is also to be undertaken, the estimated cost of £8,450 being spread over three years.

Musselburgh. — ELECTRIC LIGHTING TO REPLACE GAS.—The Town Council has decided that as soon as practicable all gas lighting installations in houses erected under the Housing Acts shall be replaced by electric lighting.

Nelson.—SINGLE TARIFF FOR NEW HOUSES.—Confronted with a serious shortage of meters the Electricity Committee has decided to abolish separate tariffs and make one all-in charge for light and power in new houses. It will be similar to the rateable value tariff.

Nottingham.—POWER STATION EXTENSIONS.—Extensions to North Wilford power station, estimated to cost £6,000,000 when the whole scheme is completed, are progressing satisfactorily, and it is probable that the first of the new units being installed will be put into commission about the end of January.

South Wales.—SEVERN PROPOSALS.—At the House of Commons last week, Messrs. Shinwell, Bevan and Williams received a deputation from the Montgomeryshire County Council which urged that the Government should undertake an inquiry into the possibility of harnessing the upper reaches of the Severn. It was suggested that such a scheme would provide a full water supply to Montgomeryshire and Radnorshire as well as other areas; constitute a method of flood control; and provide a source of electric power. The Ministers promised that the matter would receive careful attention.

Walton and Weybridge.—PRICE INCREASES.—In view of the deficit of £9,760 on the past year's working of the electricity undertaking it is proposed to increase the charges as from the end of the March quarter. The lighting flat rate will be raised by 1d to 6d per kWh and the heating and cooking rate by ½d to 1½d (domestic) and 1½d (commercial). Under the two-part tariff the present charge of 1½d will be increased to 1⅝d and the 1½d charge to 1 $\frac{3}{16}$d. Before the war the lighting flat rate was 4d and the running charge under the domestic " all in " tariff ½d where an electric cooker or water heater was installed.

Warrington.—RATE CONTRIBUTION.—A sum of £10,000 is to be contributed in aid of the rates by the Electricity Department, which last year made a net profit of £11,095.

West Hartlepool.—PAYMENT OF ACCOUNTS.—During the war the Town Council decided that electricity accounts should be paid on a four-monthly basis instead of three-monthly. The borough electrical engineer has reported that the introduction of the four-monthly system coincided with a 15 per cent increase in consumption and the cumulative effect has been to produce an exaggerated impression of the cost of electricity. The Town Council has therefore agreed to revert to three-monthly accounts at the beginning of 1947.

Willesden.—SUBSTATION EQUIPMENT.—The Electricity Committee has approved a scheme for the extension and modification of the bulk supply equipment at Gibbons Road substation. Application is to be made for sanction to borrow £6,177.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Barcelona Traction, Light & Power Co., Ltd.—At the annual meeting on December 17th a statement was made regarding the company's proposals for dealing with the amounts due to the holders of its sterling bonds, interest on which has not been paid, owing to the company's inability to convert pesetas into sterling, since 1936. The bondholders, by a large majority accepted a plan by which they would be paid a capital sum in sterling instead of running the risk of a possible continued accumulation of arrears of interest. Although the company secured the necessary commitment from "a group interested in the successful operation of the company" it had failed to secure the necessary permission of the Spanish Government and the British Treasury was not prepared to consider the plan until that permission was obtained.

It has been intimated to the company that an offer may be made by parties substantially interested in the prior lien bonds to purchase the bonds of other holders at a price equal to or slightly above the December 14th market price. The company is continuing to press for the Spanish Government's sanction to the conversion of pesetas to sterling to enable it to meet its liabilities to holders of the sterling bonds.

Crossley Bros., Ltd., last Friday offered for subscription 475,000 5 per cent 5s. cumulative preference shares at 6s. each and 475,000 5s. deferred ordinary shares at 15s. 6d. each. The deferred ordinary shares are entitled to participate in the profits remaining after dividends have been paid on two classes of 5 per cent preference shares and 7 per cent preferred ordinary shares. The company has no debenture or mortgage debt. In the past three years the existing deferred ordinary shares have received dividends of 5, 10 and 12½ per cent, respectively. The proceeds of the issue will be used to finance the company's large programme of extension and development.

The Mexborough & Swinton Traction Co. has called an extraordinary general meeting for January 8th at which a Provisional Order for which application has been made to the Minister of Transport will be submitted. This Order relates to the use of trolley-buses on certain routes in the urban districts of Mexborough and Conisborough, West Riding.

The Great Northern Telegraph Co., Ltd., has announced an unchanged interim dividend of 2½ per cent in respect of the second half of 1946.

The Globe Telegraph & Trust Co., Ltd., is again paying an interim dividend of 1 per cent, tax free.

Cape Electric Tramways, Ltd., reports a revenue for the year ended June 30th last of £98,628 (against £60,985). The dividend is maintained at 6 per cent and £109,790 (£67,505) is carried forward.

The Bagdad Light & Power Co., Ltd., reports a profit for the past year of £21,733, as compared with £17,246 for the preceding year. The dividend for the year is 6 per cent (against 5 per cent).

Johnson Matthey & Co., Ltd., are maintaining their interim dividend at 3 per cent.

New Companies

Daveen Manufacturing Co., Ltd.—Registered December 10th. Capital, £3,000. To acquire the business of manufacturers of, and dealers in, lampshades and standards and electrical and other fittings carried on by A. J. Stockford and D. I. Phillips at 41, Howland Street, W.1. Directors: A. J. Stockford and D. I. Phillips. Regd. office: 506, Ulster Chambers, 168, Regent Street, W.1.

Slaters Electricals, Ltd.—Registered December 2nd. Capital, £5,000. Electrical, mechanical, marine, constructional, internal combustion and general engineers, etc. Directors: H. W. Slater and H. F. Slater. Regd. office: 34, Princess Way, Team Valley Trading Estate, Gateshead-on-Tyne.

C. A. Pocock & Co., Ltd.—Registered November 30th. Capital, £1,500. To acquire the business of an electrical engineer and contractor carried on by Charles A. Pocock at 10, Mill Street, Somercotes, Derbyshire. Directors: C. A. Pocock and J. O. Clark. Regd. office: 10, Mill Street, Somercotes.

W. E. Rawcliffe, Ltd.—Registered November 29th. Capital, £500. Manufacturing electricians and mechanical engineers, radio engineers, electrical engineers, etc. Directors: W. E. Rawcliffe and Mary A. Rawcliffe. Regd. office: 18a, Church Road, St. Annes-on-Sea.

Interboro Electrical Installations, Ltd.—Registered December 3rd. Capital, £500. Electrical and general engineers and dealers, etc. Directors: S. G. Griffiths, C. O. Smith, A. W. Main and W. H. Boyd. Regd. office: 3, Holly Hill, Hampstead, N.W.3.

Rolls Products, Ltd.—Registered November 29th. Capital, £100. Manufacturers of, and dealers in, electrical apparatus and appliances, tools, radio and television equipment, etc. Secretary: Eileen R. Pinnell. Regd. office: 22, Charing Cross Road, W.C.2.

Rolls Switches, Ltd.—Registered November 29th. Capital, £100. Manufacturers of, and dealers in, electrical switches and all kinds of

electrical switchgear, tools, radio and television apparatus and equipment, etc. Other particulars similar to Rolls Products, Ltd.

Northern Electronic Industries, Ltd.—Registered November 27th. Capital, £500. To acquire the business of retail radio and electric supply shops now carried on by G. A. Taylor and R. M. Taylor at 372, Rochdale Road, Collyhurst, Manchester, and 38, Mumps, Oldham. Directors: G. A. Taylor and R. M. Taylor. Regd. office: Windsor Works, 349, Manchester Street, Oldham.

Lewis Battery Service, Ltd.—Registered December 4th. Capital, £3,500. Wireless and television manufacturers and service engineers, etc. Directors: T. R. J. Lewis (permanent governing director), Mrs. L. V. Lewis and W. D. Buckingham. Registered office: 6/7, Queen Street, Cheapside, E.C.4.

John Sylvester, Ltd.—Registered December 4th. Capital, £1,000. Manufacturers, assemblers and makers of electrical and electronic goods and equipment, etc. Permanent directors: J. D. Sylvester, D. C. Moore and E. G. Warland. Regd. office: 89, Wandsworth Bridge Road, S.W.6.

Electron Engineering Co., Ltd.—Registered December 4th. Capital, £1,000. Maintenance and installation contractors and engineers, general, consulting, radio and television engineers, manufacturers of, and dealers in, electrical goods, etc. Secretary: F. Dirs, 76, New Cavendish Street, W.1.

A. G. Earwicker, Ltd.—Registered December 4th. Capital, £3,000. Manufacturers, designers and repairers of, and wholesale or retail dealers in, electrical, radio, television and associated apparatus and appliances, etc. Subscribers: A. G. Earwicker and R. H. Foster. Solicitors: Wills Chandler & Burrows, Basingstoke.

Folco (Radio Services), Ltd. — Registered November 12th. Capital, £1,000. To acquire the business of radio servicing carried on by G. R. A. Foll at 18, Rose Bank, Rawtenstall. Directors: L. P. Talbot, W. Ashworth, G. R. A. Foll, Jane Foll and J. Ainsworth. Regd. office: Brook Street, Rawtenstall.

H. L. Bolton Engineering Co., Ltd.—Registered November 27th. Capital, £7,000. Electrical, mechanical, etc., engineers, manufacturers of, and dealers in, domestic appliances, wireless parts, etc. Directors: H. L. Bolton and Mary Bolton. Regd. office: 106, Queen's Head Road, Birmingham, 21.

Electropower Co., Ltd.—Registered December 4th. Capital, £500. Manufacturers of, dealers in, and agents for, the sale of electrical and mechanical apparatus, etc. Directors: L. P. Bevan and Mrs. E. W. Bevan, both of 3, Retreat Close, Kenton, Middlesex.

Rowland & Colbourne, Ltd.—Registered December 13th. Capital, £200. To acquire (1) the business of builders and decorators carried on by A. R. Rowland and E. L. Rowland, and (2) the business of an electrical contractor carried on by E. W. Colbourne. Directors: A. R. Rowland, E. L. Rowland, A. E. P. Knapp and E. W. Colbourne. Secretary: A. Knapp. Regd. office: The Elms, Sompting Road, Lancing, Sussex.

Increases of Capital

Laurence, Scott & Electromotors, Ltd.—Increased by £400,000 in 400,000 4½ per cent non-redeemable preference shares of £1 each (entitled to vote only in special circumstances), beyond the registered capital of £700,000. (Note: 6,000 of the company's redeemable preference shares were redeemed in October.)

Electrical Components, Ltd.—Increased by £100,000, beyond the registered capital of £150,000.

E. P. Allam & Co., Ltd.—Increased by £14,000 beyond the registered capital of £6,000.

Electron Equipment (Portsmouth), Ltd.—Increased by £4,500 beyond the registered capital of £500.

C. & D. Electric (Appliances), Ltd.—Increased by £11,000 beyond the registered capital of £1,000.

F. J. Lloyd & Sons (Burnham), Ltd.—Increased by £1,000 beyond the registered capital of £500.

Liquidations

Coventry Automatic Telephones, Ltd.—Winding up voluntarily. Liquidator, Mr. W. E. Fordham, 31, Copthall Avenue, London, E.C.2. Particulars of claims to the liquidator by January 7th. This notice is entirely formal as all known creditors have been, or will be, paid in full.

Hollinwood Electric Light & Power Co., Ltd.—Winding up voluntarily. Liquidator, Mr. S. L. Stapleton, 1, Sixth Avenue, Limeside Estate, Hollinwood, Oldham.

Larne Electric Light & Power Co., Ltd.—Particulars of claims by January 31st to the liquidator, Mr. S. Boyle, 38, Donegall Place, Belfast.

Bankruptcies

R. J. Thurlow, electrical engineer, 13, Bolton Lane, Ipswich, carrying on business at 27, Fore Street, Ipswich, as Electrical & Radio Repair Services.—Trustee, Mr. K. E. Fisk, 13A, Great Colman Street, Ipswich, released December 7th, 1946.

H. H. Moore, Junior, electrical engineer, "The Lindens," West Cliff Gardens, Bournemouth.—First and final dividend of 11s 9d in the £, payable December 30th at 10, Rockstone Place, Southampton.

W. T. Spencer, electrician, 376, Oldham Road, Newton Heath, Manchester.—Receiving order made December 11th, 1946, on a creditor's petition.

STOCKS AND SHARES

THE Stock Exchange being closed on Christmas Eve and the two following days, it was not to be supposed that business in advance would show any considerable degree of activity. The Government's decision to proceed with the Transport Bill, in the teeth of extensive opposition, aroused more regret than surprise. It had no effect upon the prices of Home Railway stocks, and electricity supply shares have hardly moved from the levels of a week ago. The high-priced preference shares are rather easier. The radio group continues dull. On the other hand, the ordinary shares of the equipment and manufacturing companies remain very firm. New issues compete with existing stocks and shares, but without having any material influence upon the quotations of the latter. Vague talk of money being still cheaper in the New Year is responsible for the strength that continues to be shown by gilt-edged securities.

Home Electricity Supply

Business in Home electricity supply shares is, for this season of the year, fairly active. The same tendency is noticeable as that to which attention has already been drawn here. That is to say, the smaller holder of shares has been, and is, inclined to dispose of his interests on account of the probably reduced income which nationalization would entail. Trust companies and other large concerns have come, however, into the market as substantial buyers, in order to obtain the Compensation Stock at a lower price than that which obtains at the present time for similar British Government securities.

Cross Currents

Although no official announcement has been made on the subject, it is taken for granted, if prematurely, that any new security issued in exchange for shares in the Home electricity supply companies, will take the form of 2½ per cent stock at 100. Thanks to the cross currents —the selling by small holders, and buying by institutional investors—the market keeps tolerably steady. As compared with a month ago, the majority of changes are against holders, for which the cuts in electricity and the constant fears of coal shortage are to some extent responsible.

Home Rails

Prices in the Home railway market have settled down at a point or two below those fixed by the Government for compensation purposes. A substantial volume of business is being done between buyers who see an opportunity for securing the equivalent of Government stock at a discount, and sellers unwilling to accept the prospect of a reduced income from the Compensation Stock. Since the sellers are parting from their stock at figures below the take-over value, there is evidently a body of opinion inclined to think that, at the appointed time, conditions for reinvestment to maintain the income may be even more difficult than they are now. The contrary view, however, does not lack supporters. Southern Railway 5 per cent preference has gained 4 points since a month ago. London Passenger Transport issues are also better: the "C" stock is 1 up at 65½. Thomas Tilling rose abruptly from 58s. 6d. to 61s. 3d.

Changes on the Month

Cable & Wireless 5½ per cent preference at 119½ has shed 5½ during the past month, but the ordinary is a point up at 118. Both classes of Globe Telegraphs have hardened, the 6 per cent preference being 3s. 6d. higher. A rise of 3½ to 38 in Great Northern Telegraphs has reflected a moderate demand in a narrow market. International "Tel. & Tel." at 20 recovered $2 of month's fall of $3. Marconi Marines are a better market, but Canadian Marconis have receded to 13s. 9d. Anglo-American Telegraphs further continued their earlier improvements. The radio group has lost favour for the time being: there are falls in Radio & Television, E.M.I., Scophony and Cossor. E. K. Cole at 29s. 6d., and Plessey at 37s. 6d.—the latter on the increased dividend —are two exceptions to the dullness in this market.

Upward Movements

Amongst the notable changes of the past month, General Cables are prominent with a 9s. gain at 33s., the dividend having been raised from 15 per cent to 25 per cent. Tube Investments are 10s. higher at 6$\frac{18}{18}$ on the expansion in the company's interests recently announced. A rise of 5s. lifted De la Rue to 13¾, following upon the previous month's advance of 20s. Mather & Platt at 60s. gained 4s. 3d. Johnson & Phillips at 85s. 6d. and Greenwood & Batley at 55s. are 4s. to the good. English Electrics rose 3s. 6d. to 66s. 6d. Reference to the table of prices will show a number of other improvements.

Equities on Offer

On Associated Electrical Industries shares, which are on offer at 74s. 3d., the yield on the current dividend is now no more than £2 13s. 6d. per cent—a return which measures the degree of confidence held in the chances of a more liberal distribution next year. Of the other electrical market leaders, General Electrics and Crompton Parkinsons return £3 8s. 0d. per cent and 3½ per cent respectively. Among the shares which come less frequently into the market, mention may be made of a line of Reyrolles at 81s. 3d., yielding £3 1s. 3d. per cent on the 12½ per cent dividend. Crabtree Electrical are available at 48s. 3d. ex dividend, to yield £3 12s. 6d. per cent, and Siemens can be bought at 38s. 3d., the return being £3 18s. 6d.

(*Continued on page* 1076)

ELECTRICAL INVESTMENTS

Past Month's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price Dec. 18	Month's Rise or Fall	Yield £ s. d.
Home Electricity Ordinary					
Bournemouth and Poole	12½	12½	65/6	−6d.	3 19 3
British Power and Light	7	8	33/6	..	4 15 7
City of London	6	7	34/–	..	4 2 4
Clyde Valley	8	8	42/6	..	3 15 3
County of London	8	10	45/–	−6d.	4 9 0
Edmundsons	6	6	29/–	+1/–	4 2 9
Elec.Dis.Yorkshire	9	9	48/6	−1/–	3 14 0
Elec. Fin. and Securities	13½	15	66/6	..	4 10 3
Elec. Supply Corporation	10	10	46/3	−1/6	4 6 7
Lancs. Light and Power	7½	7½	33/6	−1/–	4 9 7
Llanelly Elec.	6	6	27/6	−6d.	4 7 3
Lond.Assoc.Electric	4	6	28/–	..	4 5 9
London Electric	6	6	27/6	−6d.	4 7 3
Metropolitan E.S.	8	9	44/6	..	4 1 0
Midland Counties	8	8	47/6	+1/–	3 7 6
Mid. Elec. Power	9	9	47/0	−6d.	3 16 8
Newcastle Elec...	7	7	34/–	..	4 2 4
NorthEasternElec.	7	7	32/–	−3/–	4 7 6
Northampton	10	10	49/–	−2/–	4 1 8
Northmet Power	7	9	43/6	..	4 2 10
Scottish Power	8	9	42/–	−1/6	4 5 9
Southern Areas	5	5½	23/–	−6d.	4 15 7
South London	7	7	33/–	..	4 4 10
Yorkshire Elec...	9	9	47/6	..	3 16 0
Public Boards					
Central Electricity:					
1963–93	3½	3½	110	−3	3 3 7
1974–94	3½	3½	111	−2	2 18 6
LondonElec.Trans.	2½	2½	101½	−½	2 9 3
Lond.Pass.Trans.Bd.					
A	4½	4½	127½	..	3 11 0
B	5	5	123½	+½	4 1 0
C	3	3	65½	+1	4 11 7
Overseas Electricity Companies					
Atlas Elec.	Nil	Nil	9/9	+1/–	—
Calcutta Elec.	6*	6*	51/3	−3/9	2 6 8
Cawnpore Elec.	13	13	57/6	−1/–	4 11 0
EastAfricanPower	7	7	47/–	+1/–	2 19 7
Jerusalem Elec...	5	5	24/–	..	4 3 4
Madras Elec.	4	6	37/–	+6d.	3 4 9
Montreal Power	1½	1½	25/–	+½	—
Nigerian Elec.	10	12½	47/6	+5/6	5 9 3
PalestineElec."A"	5*	6*	36/6	..	3 5 6
Perak Hydro-elec.	6	7	15/–	..	—
Tokyo Elec. 6%	6	6	44½	−5	—
VictoriaFallsPower	15	19	5¾	+¼	3 6 0
Whitehall Inv.Pref.—	6	28/6	+1/–	4 4 3	
Equipment and Manufacturing					
Aron Elec. Ord...	15	10	51/3	..	3 18 2
Assoc. Brit. Eng.	8	12	42/6	..	5 13 0
Assoc. Elec.:					
Ord.	10	10	74/6	+2/6	2 13 9
Pref.	8	8	48/6	+1/–	3 6 0
AutomaticTel.&El.	12½	12½	76/3	+2/–	3 5 5
Babcock & Wilcox	12	12½	70/–	+1/–	3 11 5

Company	Dividend Previous	Dividend Last	Middle Price Dec. 18	Month's Rise or Fall	Yield £ s. d.
Equipment and Manufacturing (*Continued*)					
Baldwin,H.J.(2/–)	10	20	12/6	..	3 4 0
British Aluminium	10	8	46/–	+2/9	3 9 7
British Insulated & Callender's	..	..	46/6	..	—
British Rola (2/–)	15	15	7/–	..	4 5 9
BritishThermostat (5/–)	18½	18½	23/9	+1/8	3 17 9
BritishVac.Cleaner (5/–)	30	20	25/–	..	4 0 0
Brush Ord.(5/–)	10	4	7/9	..	2 11 7
Burco (5/–)	15	20	30/–	..	3 6 8
ChlorideEl.Storage	15	15	5½	..	2 18 6
Christy Bros.	12½	17½	85/–	..	4 2 4
Cole, E. K. (5/–)	20	20	29/6	+6d.	3 7 9
Cossor, A. C. (5/–)	10*	12½*	30/6	−6d.	2 1 0
Crabtree (10/–)	17½	17½	48/–	+6d.	3 13 0
CromptonParkinson Ord. (5/–)	22½	22½	32/–	−2/–	3 10 4
De La Rue	40	45	13½	+½	3 5 8
Decca (1/–)	100	112	52/6	..	2 2 8
E.M.I. (10/–)	8	8	26/3	−2/3	3 1 1
Elec. Construction	10	12½	65/–	+1/6	3 17 0
Enfield Cable Ord.	12½	12½	54/–	+½	—
English Electric	10	10	66/6	+3/6	2 19 9
Ericsson Tel. (5/–)	22*	20*	56/3	+2/6	1 15 6
Ever Ready (5/–)	40	40	50/–	+3/–	4 0 0
Falk Stadelmann	7½	10	46/3	+½	4 6 7
Ferranti Pref.	7	7	37/–	+9d.	3 15 8
G.E.C. Pref.	6½	6½	41/3	+9d.	3 3 3
Ord.	17½	17½	103/–	..	3 7 10
GeneralCable(5/–)	15	25	33/6	+9/6	3 14 7
Greenwood&Batley	15	15	55/–	+4/–	5 9 1
H.T.A. (10/–)	12½	10	21/3	..	4 14 0
Heatrae (3/–)	12½	12½	7/6	−3d.	5 0 0
Henley's (5/–)	20	20	28/6	+6d.	3 10 0
4½% Pref.	4½	4½	30/–	+1/6	3 0 0
Hopkinsons	17½	20	5⅞	..	3 17 3
Intl. Combustion	30	32½	10¾	+⅛	3 1 0
Johnson & Phillips	15	15	86/–	+4/6	3 9 9
LancashireDynamo	22½	22½	6	..	3 15 0
Laurence,Scott(5/–)	12½	12½	15/6	+3d.	4 0 8
London Elec. Wire	7½	7½	42/–	..	3 11 5
Mather & Platt	10	10	60/–	+4/3	3 6 8
Metal Industries(B)	9	10	61/3	−6d.	3 5 9
Mid. Elec. Mfg.	25	25	9⅛	+⅛	2 14 6
Murex	20	20	97/6	+⅛	4 2 0
Newman Ind.(2/–)	22½	22½	9/6	+3d.	4 14 6
Plessey (5/–)	20	30	37/6	+⅛	4 0 0
Power Securities	6	6	32/–	..	3 15 0
Pye,Deferred (5/–)	25	25	32/6	..	3 17 0
Radio & Tel. (2/–)	25	10	10/0	−1/6	—
Revo (10/–)	17½	20	53/–	+1/–	3 15 6
Reyrolle	12½	12½	80/–	+2/6	3 2 6
Scophony (5/–)	—	—	8/6	−6d.	—
Siemens Ord.	7½	7½	38/–	+1/–	3 19 0
Strand Elec. (5/–)	10	12½	12/3	+6d.	5 3 1
Switchgear&Cowans (5/–)	20	20	25/–	..	4 0 0
T.C.C. (10/–)	10	12½	33/–	..	3 15 8

(*Continued on next page*)

* Dividends are paid free of Income Tax.

Company	Dividend Previous	Dividend Last	Middle Price Dec. 18	Month's Rise or Fall	Yield p.c. £ s. d.
Equipment and Manufacturing (*Continued*)					
T.C. & M.	10	10	55/-	+⅛	3 12 9
TelephoneMfg.(5/-)	9	9	14/6	+1/-	3 2 1
Thorn Elec. (5/-)	20	20	30/-	..	3 6 8
Tube Investments	20	22½	6¹⁵⁄₁₆	+10/-	3 8 2
Vactric (5/-)	Nil	Nil	18/-	+6d.	—
Veritys (5/-)	7½	7½	8/-	..	4 13 10
WalsallConduits(1/-)	55	55	58/-	+2/-	3 15 10
Ward & Goldstone (5/-)	25	35	53/-	+1/-	3 6 0
Watford (2/-)	15	15	7/9	+6d.	3 19 0
WestinghouseBrake	14	14	78/9	..	3 11 1
West, Allen (5/-)	7½	7½	10/-	+6d.	3 15 0
Traction and Transport					
Brit.Elec.Traction:					
Def. Ord.	45	45	1230	+10	3 9 3
Pref. Ord.	8	8	195	+3	4 2 1
Calcutta Trams.	6½	7½	55/6	−2/-	2 14 0
Cape Elec. Trams	5	6	37/6	..	3 4 0
Southern Rly.:					
5% Prefd.	5	5	75½	+1	6 12 3
5% Pref.	5	5	122½	+4	4 1 8

Company	Dividend Previous	Dividend Last	Middle Price Dec. 18	Month's Rise or Fall	Yield p.c. £ s. d.
Traction and Transport (*Continued*)					
T. Tilling	10	10	61/3	+3/3	3 4 0
West Riding	10	15	52/6	−1/-	5 14 3
Telegraph and Telephone					
Anglo-Am. Tel.:					
Pref.	6	6	147½	+4	4 1 6
Def.	1½	1½	37½	+2	4 0 0
Anglo-Portuguese	8	8	28/6	−6d.	5 12 4
Cable & Wireless:					
5½ Pref.	5½	5½	119½	−5½	4 12 0
Ord.	4	4	118	+1	3 7 10
CanadianMarconi$1	Nil	4 cts.	13/9	−⅛	—
Globe Tel. & Tel.:					
Ord.	8½*	5*	46/6	+1/6	2 3 5
Pref.	6	6	39/6	+3/6	3 0 8
GreatNorthernTel. (£10)	20	18	38	+3½	4 14 9
Inter. Tel. & Tel.	Nil	Nil	19	+1	—
Marconi-Marine.	7½	7½	33/6	..	4 9 7
Oriental Tel. Ord.	4	4	53/6	−2/-	—
Telephone Props.	Nil	6	21/6	..	5 11 7
Tele. Rentals(5/-)	10	10	15/-	..	3 6 8

* Dividends are paid free of Income Tax.

Stocks and Shares (*Continued from p.* 1074)

per cent. On Plesseys, which can be bought at 38s. 3d., the return on the recently increased dividend is 1s. under 4 per cent. Chloride Electrical Storage "A" shares are offered in a small way at 5½. They give £2 18s. per cent on the money.

Preference Shares

A return of 4 per cent is available from the recently issued Aberdare Cables 5½ per cent preference, now quoted at 27s. 6d. Brush 5½ per cent preference are on offer at 25s. 6d. to yield £4 3s. 6d. per cent; and Laurence Scott 4½ per cents at 23s. 6d. giving £3 12s. 3d. per cent. E. K. Cole 7 per cent preferred ordinary are entitled, after the fixed dividend, to participate up to a further 3 per cent when 7 per cent has been paid on the ordinary. They have received the full 10 per cent in each of the last four years. At 40s. the shares give a 5 per cent return on that basis. Yields on the preference shares of English Electric and General Electric are in the neighbourhood of 3 per cent. Rather more can be obtained from the less familiar high-priced preference issues. Watford Electric 6 per cent 10s. preference are available at 16s., and Electric Construction "sevens" at 41s. 3d., the respective returns being £3 15s. 0d. per cent and £3 8s. 0d. per cent.

Trustee's Headache

Stock Exchange brokers are confronted every day with cases of genuine distress arising from the prospect of a severe cut in income when the nationalized stocks are replaced by a presumably much lower-yielding security. For the stockholder with no restriction on his actions, there are difficulties enough in finding satisfactory alternatives which would maintain the income. For the trustee with limited investment powers, the problem is yet more acute. A pressing demand has arisen for widening the range of securities eligible for the investment of trust money. Many people consider that the latitude in this respect could be widened without danger, affording much needed relief to those dependent on trust funds from which the income is being steadily whittled away by redemptions, conversions and, now, by nationalization. The Government recently refused to assent to the suggestion, but hope is by no means quenched that such an obvious relief will be accorded later on.

Dictograph Telephones, Ltd., point out that the reference to their new preference shares in the "Stocks and Shares" column of our December 13th issue was incorrect. The dividend is 5, not 5½, per cent making the yield £4 per cent, not £4 8s., at the issue price of 25s.

Contract for Road Signs

ONE of the largest contracts for road signs placed in this country has been received by the Tube Investments' subsidiary, Gowshall, Ltd., for erection in the City of Westminster. The order is for 600 gas and 600 electrically illuminated "Keep Left" guardposts designed according to the Report of the Departmental Committee on Traffic Signs and approved by the Ministry of Transport. The new guardposts, which are 4-ft high with both the upper and lower glass panels illuminated, are the result of some months' development and tests on the part of Tube Investments' engineers.

Railway Claims

Conditions of Carriage Surveyed

By Graham Saville

WITH traffic dispatched by railway goods service, three sets of conditions are of principal interest to electrical firms. These are lettered "A," "B" and "E," and cover merchandise as follows :—

"A" Merchandise (other than dangerous goods and merchandise for which terms and conditions are specially provided) when carried by merchandise train at company's risk rates.

"B" (*a*) Merchandise (other than dangerous goods and merchandise for which terms and conditions are specially provided) when carried by merchandise train at owner's risk rates; and (*b*) Merchandise which is included in the Classification of Goods by merchandise train as accepted for carriage at owner's risk only.

In view of the increase in pilferage, loss and damage it is imperative that the conditions of carriage should be understood in order that compensation may be obtained

"E" Damageable goods not properly protected by packing when carried by merchandise train at company's risk rates.

It will be found that a very large proportion of traffic is covered under conditions "A." In this case the railway company is liable for any loss, misdelivery or damage unless it can prove that such arose from any of the following circumstances:—Act of God; act of war or of the King's enemies; arrest or restraint of princes, or rulers, or seizure under legal process; orders or restrictions imposed by the Government or any Department thereof; act or omission of the trader, his servant, or agent; inherent liability to wastage in bulk or weight, latent defect or inherent defect, vice or natural deterioration of the merchandise; or casualty (including fire or explosion).

Even when such loss, misdelivery or damage arises from any of these causes, the railway company, to escape liability, must be able to prove that it used all reasonable care and foresight in the carriage of the goods. On the other hand, if there has been fraud on the part of the trader, the railway company is relieved of all liability.

There are various classes of electrical equipment which can, if the consignor so desires, be forwarded under owner's risk (or "B") conditions; some examples are:—Electric batteries (not containing liquid); electric lamps or torches (pocket); electric lighting fittings (without lamps) for exterior lighting (without glass); electric stoves, grates, heaters and ranges; and regulating resistances (except motor starting switches).

Under these conditions the railway company is not liable for loss, damage, deviation, misdelivery, delay or detention of or to a consignment or any part of a consignment unless it can be proved that it arose through the wilful misconduct of the railway company or its servants. Electrical concerns will, however, be interested in the three exceptions to this liability which apply if the railway company is unable to show that the non-delivery, pilferage or misdelivery of goods was not caused by its negligence or misconduct. The exceptions are as follows:—

(1) Non-delivery of the whole of a consignment or of any separate package forming part of a consignment, properly packed and addressed in accordance with the requirements of the Standard Terms and Conditions, unless non-delivery is due to accidents to trains or to fire.

(2) Pilferage from packages of merchandise protected otherwise than by paper or other packing readily removable by hand, provided the pilferage is pointed out to a servant of the railway company on or before delivery.

(3) Misdelivery where merchandise addressed in accordance with the requirements of the Standard Terms and Conditions is not tendered to, or placed at the disposal of, the consignee, within twenty-eight days, or in the case of perishable merchandise, within a reasonable time which shall not be less than seventy-two hours after receipt of the consignment by the railway company to whom the goods were handed by the sender.

Electrical firms are also concerned with the conditions lettered "E," as certain types of electrical apparatus when not conforming with certain packing regulations come under this heading. Under these damageable goods conditions, the railway company is not liable for loss or damage except when it can be proved that it arose through the wilful misconduct of the railway company or its servants, or would have occurred had the goods been properly protected by packing and the railway company would have been liable had the goods been carried under the ordinary company's risk conditions.

Observing Time Limits

Perhaps the most important point with regard to present day presentation of complaints and claims is to observe the time limits laid down. In connection with this there has been an extension of the periods from those which were laid down in the Standard Terms and Conditions of Carriage. In cases of partial loss, consisting of damage, pilferage, loss, delay or detention, the complaint must now be made within six days and the claim within ten days of the termination of transit. With the loss of a whole consignment or a complete package or packages forming part of a consignment, the complaint must be made within twenty-eight days and the claim presented within forty-two days of the dispatch of the merchandise.

The regulation indicates that all claims and complaints must be in writing and addressed either to the forwarding or delivering stations or to the district or head office of the forwarding or delivering railway company. Recently, railway companies have been very particular in maintaining their rights to reject claims which are not made within these time limits. Provision is, however, made in the Standard Terms and Conditions for dealing with exceptional circumstances which prevent the lodging of complaints and claims within the statutory periods: the appropriate section reads:—

> "Provided that if in any particular case a trader before action is brought proves to the satisfaction of the company, or where the company is not so satisfied, of the Railway Rates Tribunal, that it was not reasonably possible for him to advise the company in writing or to make his claim in writing within the aforesaid times, and that such advice or claim was given within a reasonable time, the Tribunal may, if having regard to all the circumstances they consider it equitable, declare that nothing in this condition shall be a bar to the maintenance of proceedings against the company."

Another important bearing on the possibility of obtaining compensation in the event of loss or damage is the signature given for the receipt of merchandise. Where there has been obvious damage or pilferage it is of course essential that the merchandise should be signed for "Damaged" or with some similar remark. It is also generally advisable that even when the goods are in apparently good order the signature be qualified with such a remark as "Not examined." The effect of this is to prevent the railway company from being able to state that it holds a clear signature for the goods.

It will be recalled that with regard to the second exception for owner's risk traffic it is stipulated that the pilferage should be pointed out to a servant of the railway company on or before delivery. In such circumstances it is also advisable that the qualification should be given on the railway company's delivery sheet or warehouse book, but it must also be borne in mind that the requirement for a written complaint is not complied with by any qualification on railway company's documents.

Miscellaneous Points

There are, of course, a considerable number of other points which have to be attended to if claims are to be successful, some being the disposal of salvage, the protection afforded by the Carriers Act and "inherent vice." Consignors will also find it to their advantage to give full details to the railway company when presenting their claim, and it will often be found that considerable clerical labour is saved by having special forms printed for this purpose.

The conditions of carriage by passenger train are very similar to those for goods train traffic, the only major exception being with regard to merchandise carried under owner's risk conditions. With owner's risk traffic, the railway company is normally only liable in respect of loss or damage arising from wilful misconduct. There are again exceptions dealing with non-delivery, pilferage and delay similar to goods train traffic, but in any case the railway liability is never in excess of 75 per cent of the net invoice value of the merchandise.

Finally, large electrical concerns may be

interested in the special commuted claims agreements which it is now possible to arrange with the railway companies. Under this scheme the trader refrains from lodging claims on the railway company, and in return the railway company makes a bulk payment to the trader. Normally there is a limit to the value of the claims not lodged and the payment by the railway company is in the form of a percentage of the carriage charges on the traffic covered by the agreement. It may be mentioned that the percentage under existing commuted claims arrangements has been affected by the increase in railway charges and firms having such agreements in operation may find it an opportune time to review the whole scheme in view of the enhanced value of goods generally and the greater number of cases of damage and loss now arising.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

AKT.-GES. Brown, Boveri & Cie.—" Multi-break electric gas blast circuit-breakers." 17319/44. September 11th, 1943. (582835.)

Automatic Telephone & Electric Co., Ltd.—" Telephone substation circuits." 4793/44. May 10th, 1943. (582801.)

Automatic Telephone & Electric Co., Ltd., and C. E. Beale.—" Telephone or like systems." 17737. September 16th, 1944. (582838.)

Automatic Telephone & Electric Co., Ltd., and G. A. Burns.—" Indicating boards for electric power transmission systems or the like." 7845. April 27th, 1944. (582741.)

R. W. Bailey, P. P. Starling, H. H. Burton, A. B. Winder, Metropolitan-Vickers Electrical Co., Ltd., and English Steel Corporation, Ltd.—" Casting metals." Cognate applications 7408/40 and 6274/41. April 24th, 1940. (582846.)

J. B. Birks.—" Electromagnetic radiators or receivers." 12864. July 5th, 1944. (582856.)

R. H. F. Boot and Under Water Welders & Repairers, Ltd.—" Electric arc cutting devices." 4027. March 3rd, 1944. (582731.)

K. W. Branczik and O. L. B. Westergaard.—" Cooling towers." 3094. February 18th, 1944. (582727.)

British Electricon (London), Ltd., and W. A. Chambers.—" Electrical relays." 5959. March 9th, 1945. (582793.)

British Thomson-Houston Co., Ltd.—" Electromagnetic wave propagation systems." 6159/43. April 16th, 1942. (582757.) " Impedance transformer systems." 17310/43. October 24th, 1942. (582760.) " Secret carrier wave signalling systems." 19732. November 25th, 1943. (582798.) " Electric insulating compositions." 20287/43. December 7th, 1942. (582799.) " Washing machines." 6431/44. April 9th, 1943. (582804.) " X-ray generating apparatus." 13881/43. August 26th, 1942. (582889.) " Insulating bushings for electrical apparatus." 18797/44. October 1st, 1943. (582915.) " X-ray tubes." 18798/44. October 2nd, 1943. (582916.) " Headlight indicators for self-propelled vehicles." 19042/44. October 6th, 1943. (582920.) " Electrical insulators." 23396/45. September 14th, 1944. (582929.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—" Control of the transmission of electromagnetic waves." 17456. October 22nd, 1943. (582848.) " Noise reduction in radiolocation and communication systems." 18439. November 5th, 1943. (582849.) " Pulse generating systems." 18561. November 8th, 1943. (582850.) " Pulse generating systems." 19228. November 17th, 1943. (582851.)

L. F. Broadway, N. C. Barford and A. F. Pearce.—" Coupling of hollow electrical resonators." 10352. June 25th, 1943. (582714.)

N. E. W. Carter.—" Telephone receivers." 6311/44. April 5th, 1945. (582735.)

Cinema-Television, Ltd., and H. G. Flood.—" Electron discharge devices and methods of manufacturing such devices." 18621. September 28th, 1944. (582913.)

Farnsworth Television & Radio Corporation.—" Thermionic impulse amplifier." 8929/44. March 18th, 1943. (582744.)

General Electric Co., Ltd., and E. Friedlander.—" Electrical multi-turn windings." 18005. December 18th, 1942. (582888.)

D. L. Hings.—" Radio-frequency generating and modulating systems." 10326. July 23rd, 1942. (582795.)

V. Hope.—" Protecting devices for electric circuits and apparatus." 2676. February 14th, 1944. (582726.)

H. W. K. Jennings (B. F. Sturtevant Co.).—" Dust collecting apparatus." 11910. May 11th, 1945. (582883.)

Landis & Gyr Soc. Anon.—" Contacts of electrical switches." 13003/44. July 13th, 1943. (582817.)

Marconi's Wireless Telegraph Co., Ltd.—" Combined transmitter and receiver for radio signalling." 2827/44. February 15th, 1943. (582766.) " Oscillation generator." 3108/44. February 20th, 1943. (582767.) " Switching in wave guide transmission systems." 3487/44. February 25th, 1943. (582768.) " Apparatus for controlling the velocity of a cathode-ray beam." 1725/44. January 30th, 1943. (582892.)

P. L. Millwood and E. A. Cox.—" Automatic kettles or electrically heated water boiling receptacles." 6715. April 12th, 1944. (582897.)

M-O Valve Co., Ltd., and R. W. Sloane.—" Velocity - modulated frequency - changers." 9479. July 25th, 1941. (582886.)

Mullard Radio Valve Co., Ltd., J. A. M. Van Moll, A. J. Van Hoorn and G. L. Sutherland.—" Methods of applying emissive coatings to the cathodes of electron discharge devices." 3779. February 29th, 1944. (582729.)

Siemens Bros. & Co., Ltd., and B. A. Hensler.—" Telephone systems." 13599 July 17th, 1944. (582786.)

Soc. Anon. des Industries Radio-Electriques (S.A.D.I.R.).—" Arrangements of aerials for radio-beacons." 3674/42. May 29th, 1941. (582755.)

Standard Telephones & Cables, Ltd.—" Arrangements for ensuring a given angular relation between the rotors of two electric motors." 1677/44. February 6th, 1943. (582724.) " Cathode-ray oscillograph circuits." 17689/44. September 23rd, 1943. (582836.)

Standard Telephones & Cables, Ltd. (International Standard Electric Corporation).—" Means for amplifying and translating electrical impulses." 14669. November 14th, 1941. (582753.)

Standard Telephones & Cables, Ltd., and C. W. Earp.—" Arrangements for obstacle detection and measurement of distances by electromagnetic waves." 4506. April 3rd, 1942. (582708.)

Standard Telephones & Cables, Ltd. (trading as Stanelco Products) and J. Handley.—" Electric soldering apparatus." 15926. August 21st, 1944. (582829.)

Standard Telephones & Cables, Ltd., and M. M. Levy.—" Electrical oscillation generators." 3881. March 21st, 1941. (582752.) " Apparatus for measuring the duration of electric impulses or signals." 969. January 24th, 1941. (582885.)

Standard Telephones & Cables, Ltd., and J. D. Weston.—" Means for discriminating between complementary keyed electrical signals." 13497. July 14th, 1944. (582784.)

Standard Telephones & Cables, Ltd., P. K. Chatterjea and L. W. Houghton.—" Secrecy communication systems." 14938. October 23rd, 1942. (Addition to 580843.) (582709.)

Standard Telephones & Cables, Ltd., W. J. L. Wildbore and J. M. Kennan.—" Wire lapping or like core-covering machines." 18577. September 28th, 1944. (582911.)

P. P. Starling, H. H. Burton, A. B. Winder, Metropolitan-Vickers Electrical Co., Ltd., and English Steel Corporation, Ltd.—" Production of metal castings." 13194. August 19th, 1940. (582847.)

T. W. Tattersall.—" Switching arrangements for electric vehicles." 2257. February 7th, 1944. (582893.)

W. E. Tomlin.—" Washing machines." 7059/44. April 17th, 1945. (582739.)

Under Water Welders & Repairers, Ltd., and R. H. F. Boot.—" Electric arc welding." 6773. April 12th, 1944. (582769.)

F. E. Waller.—" Lamp supports." 18647. September 29th, 1944. (582914.)

F. Watson (Aktiebolaget Ljungstroms Angturbin).—" Turbines." 14725. August 2nd, 1944. (582825.)

Westinghouse Brake & Signal Co., Ltd. (Union Switch and Signal Co.).—" Electrical control apparatus." 17723. October 27th, 1943. (582761.)

Westinghouse Electric International Co.—" Protective systems for X-ray apparatus." 10902/43. July 7th, 1942. (582715.)

H. G. White, A. Middleton and Metropolitan-Vickers Electrical Co., Ltd.—" Resilient gear wheels." 18277. September 25th, 1944. (582878.)

F. C. Williams.—" Electronic relay circuit arrangements." 10351. June 25th, 1943. (582758.)

Amended Specifications

535127. Marconi's Wireless Telegraph Co., Ltd.—" Antenna circuit modulation systems."

570188. H. G. Solomon.—" Electric condensers more particularly intended for the production of h.f. impulses and for use in h.f. circuits."

Forthcoming Events

Friday, January 3rd. — BIRMINGHAM. — Imperial Hotel, Temple Street, 6 p.m. Illuminating Engineering Society (Birmingham Centre). " Industrial Decoration," by J. H. Nelson.

Monday, January 6th. — BIRMINGHAM. — James Watt Institute, 6 p.m. I.E.E. South Midland Centre. " Development and Design of Colonial Telecommunications Systems and Plant," by C. Lawton, and " General Planning and Organization of Colonial Telecommunications Systems," by V. H. Winson. (Joint meeting with the Institution of Post Office Electrical Engineers).

LONDON.—At the Institution of Electrical Engineers, 2, Savoy Place, W.C.2, 5 p.m. Institution of Post Office Electrical Engineers. " The Provision of Line Communications for the Fighting Services," by H. R. Harbottle.

BRADFORD.—Technical College, 7.15 p.m. Bradford Engineering Society. " Fuel Economy in Facts and Figures," by W. Goldstern.

Tuesday, January 7th. — MANCHESTER. — Engineers' Club, Albert Square, 6 p.m. I.E.E. North-Western Centre. " The Influence of Resistance Switching on the Design of High-Voltage Oil Circuit Breakers," by H. E. Cox and T. W. Wilcox.

LONDON.—Oddfellows' Hall, 186, Hammersmith Road, S.W., 7 p.m. Association of Supervising Electrical Engineers (West London Branch). " Some Applications of Electricity and Gas."

GLASGOW. — Ca'doro Restaurant, Union Street, 7.30 p.m. Electrical Society of Glasgow. " Power Factor Correction," by R. H. Bannister.

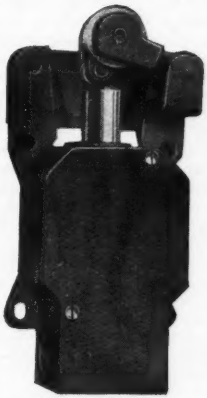
RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Plunger Switch

AN industrial switch which can be employed in place of a distant push-button for starting and stopping motors driving weaving looms and machine tools, is being made by BRITISH KLOCKNER SWITCHGEAR, LTD., of Guildford St., Chertsey, Surrey.

It is operated by the depression of a plunger, which must remain depressed while the machine is running; its release will stop the motor.



Plunger switch for actuating motor starter

This " LAT " type switch is most useful when the motor is controlled by a lever that also actuates a mechanical brake, because application of the latter will automatically stop the motor and prevent its restarting until the brake is released again. This switch merely furnishes impulses to the normal starter, so that the latter will maintain its no-volt protective circuit (when included) through separate contacts provided for the purpose. The hard brass plunger can be fitted with a rocker roller attachment, if desired. The housing is die cast, of a zinc base alloy, being 3 in. wide by 5 in. long and 1·5 in. deep; two 0·75 in. tapped conduit entries are provided.

Animal Grooming Equipment

It does not seem to be generally appreciated that a suction cleaner can be an effective means of grooming animals, as well as of cleaning farm buildings, harvesters, reaping machines and food carts, and the collection of grain. A suitable machine for these purposes is one of the industrial models made by the BRITISH VACUUM CLEANER & ENGINEERING CO., LTD., Goblin Works, Leatherhead, Surrey.

The equipment is mounted on a small push-handle base fitted with caterpillar tracks for mobility and capable of being driven either by a miniature petrol engine, or by a 1·5 H.P. three-phase motor of 400/440 V at 2,800 r.p.m. through an enclosed Wigglesworth belt. The motor is mounted upon a steel frame above the TM·6 exhauster, of the multi-stage turbine type, with six impellers on a shaft running in ball bearings. The 36-in. filter container has a removable top to enable the internal dust bag to be emptied.

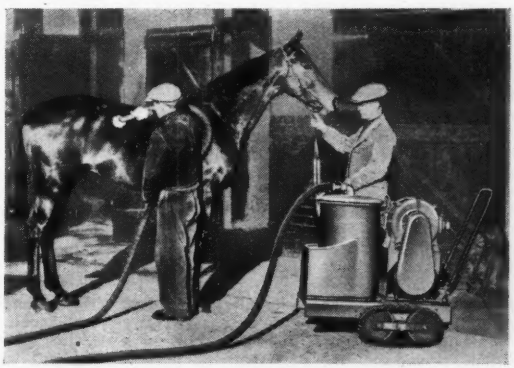
An assortment of cleaning tools and brushes is provided, but an extra charge is made for single-phase motor drive.

Automatic Oven Control

All household cookers supplied by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2, are eventually to be fitted with " Ovenmaster " automatic control as a standard feature. When possible the DC.6 thermostat is to be replaced by the DC.29, which is smaller and will be used in conjunction with either of two control units, the DC.38 for the new DC.113 cooker and the DC.39 for the older cast-iron type.

In both arrangements the thermostat is housed in a moulded bakelite case with electrical connections brought out to external terminals for easy connection in the wiring chamber. The movement of the expanding member of the thermostat is conveyed to a quick make-and-break switch capable of controlling 15 A at 200 to 250 a.c., the setting knob, which moves over a calibrated scale, being coupled to the thermostat through a connecting rod. The thermostat can be set to operate at any temperature between 200 and 550 deg F.

The new control is standard equipment on



Grooming a racehorse with a suction machine

the DC.113 cooker and will be fitted to the DC.438, 100 and 105 models, but it cannot be fitted to all G.E.C. cookers and the following will still use the DC.6 thermostat: DC.334, 434, 734, 1034, 435 and 735.

Domestic Convector

Hitherto DE RENZI HOLMES & CO., LTD., Fox's Lane, Wolverhampton, have concentrated their production on rustless unbreakable grid resistances, cam-operated contactor controllers, slider pattern rheostats and welding rheostats. Recently, however, the company has entered the domestic market with a neatly-designed 2-kW convector.

"Deren" convector

Measuring 28½ in. high by 18¼ in. wide by 6½ in. deep, this "Deren" convector is available in six attractive finishes, blue, pink, green, bronze, silver and cream. Special element units are being made up of mica and nickel-chrome wire construction of an improved shape. Four elements are arranged vertically in the base of the convector with gills between each in order to provide a greater heating surface and so accelerate the flow of hot air, the temperature of which at the vent is approximately 150 deg C. A switch is provided in the front whereby 1 or 2 kW may be brought into use at will, and there is a red pilot lamp to indicate when the apparatus is switched on. A similar 1-kW model measures 15½ × 11 × 5 in.

Audio-frequency Millivoltmeter

A convenient instrument for measuring in a simple way the small voltage drop that occurs in a.c. circuit-breaker contacts, busbar connections, heavy duty cable links, etc., is available from the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. The instrument is really an audio-frequency (25 to 20,000 c/s) millivoltmeter for high impedance circuits in communication equipment and sonic-frequency amplifying apparatus, its accuracy being approximately 3 per cent full scale reading on all ranges with true sine wave output.

The circuit comprises a two-stage amplifier with negative feed-back which stabilizes the gain at 100, and is followed by a diode rectifier and a d.c. amplifier with a degenerative action, so eliminating errors due to change in valve parameters. The amplifier is connected in a bridge circuit and the out-of-balance current indicates the voltage.

Although the instrument indicates the peak value of the wave, it is calibrated in r.m.s. volts, assuming a sinusoidal input. The short-period overload capacity is extremely high; even if full mains voltage, say 440 V, is accidentally applied to the lowest range (15 mV) no damage will result if the instrument is disconnected quickly. The greatest overload which can possibly be applied to the moving coil approximates to 100 per cent and is not sufficient to burn out the coil, even if continued indefinitely.

The measuring ranges are 15, 50, 150 and 500 mV and 1·5, 5, 15, 50 and 150 V, the consumption being 50 W at 200-250 V and 40-100 c/s. The resistive component is approximately one megohm throughout the frequency range and input capacitance is approximately 20 picofarads. The indicating instrument is of robust moving coil design with an open 5-in. scale which is appreciably longer than is usually provided in instruments of the valve-voltmeter class. The net weight of the millivoltmeter in its polished walnut case is 27¾ lb and it measures 16 × 10 × 10½ in.

Anti-frost Refrigerator Windows

A glass screen which permits good visibility at a temperature equivalent to 125 deg frost has been evolved for experimental refrigerating plant by the TRIPLEX SAFETY GLASS CO., LTD., Eckersall Road, King's Norton, Birmingham, being an adaptation of the principle used to prevent aircraft windscreen "mist up," which obscures the pilot's vision. The company overcame this problem by means of thoroughly dried air enclosed in hollow chambers. The adaptation of this method will be useful for industrial and scientific units necessitating observation of results during refrigeration.

Export Inquiries

WE have received the undermentioned inquiries regarding agencies for British electrical equipment and appliances or to import them into the territories named. We shall be glad to pass on replies received from readers which should be addressed to the Editors, quoting the number given in parentheses. We cannot vouch for the standing of inquirers and manufacturers replying to them will no doubt require the usual references :—

China.—London exporters to China wish to get into touch with makers of 5-A, two-pin plugs and sockets, 5-A s.p. switches, side-entry iron connectors and lampholders—all of bakelite. (X.169.)

India.—A representative from India now in England is seeking agencies for medium-sized firms who are not yet represented in India. He is interested in small motors, fans, domestic appliances, electrical accessories, fluorescent lamps and fittings, incandescent lamps, small ironclad switchgear and scientific electrical novelties. (X.170.)

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Dundee.—January 15th. Corporation. Multicore, high- and low-voltage paper-insulated cables. (See this issue.)

Gainsborough.—Electricity Department. One 6·6-kV switch unit. (See this issue.)

Isle of Ely.—January 4th. County Council. Installation of electric lighting at the Orchards Nursery, Wisbech. R. D. Robson, county architect, County Hall, March.

Kingston - upon - Thames. — January 13th. Borough Council. Self-interlocking type underground cable covers. (See this issue.)

London.—Metropolitan Water Board. New or second-hand alternators, three-phase, 400/440 V, for coupling to Diesel engines running at 600 r.p.m. (eighteen approximately 200 kW and six approximately 300 kW). (December 13th.)

Newark-on-Trent.—January 16th. Borough Council. P.i. and armoured cable. (December 13th.)

North Scotland.—January 20th. Hydro-Electric Board. High- and low-voltage distribution lines (wood poles) on the island of Arran. (December 13th.)

Weymouth and Melcombe Regis.—Electricity Department. Two 500-kVA three-phase transformers. (See this issue.)

Orders Placed

Carlisle.—Electricity Committee. Accepted. Transformers (£3,104). — Yorkshire Electric Transformer Co.

Dartford.—Electricity Committee. Accepted. Extension panel (£302).—A. Reyrolle & Co. 450-kVA transformer (£517).—Hackbridge Electric Construction Co.

Hackney.—Electricity Committee. Accepted. Air heater elements (£2,610).—International Combustion.

London.—Metropolitan Water Board. Accepted. Fluorescent lighting at Battersea works. —Carlin Engineering Co. (£3,988); G.E.C. (£3,008). Three electrically driven pumps for Cricklewood works (£10,929).—Harland Engineering Co.

Paisley.—Corporation. Accepted. Electrical installation at the Saucel Hill housing scheme (£1,893).—Henry C. Mort.

Salford.—Light, Heat and Power Committee. Accepted. Transformers for twelve months.—Bryce Electric Construction Co.

Southport.—Estates Committee. Accepted. Electrical installations in 66 houses at Rufford Road (£1,922).—Brooks & Southworth.

Stalybridge.—Markets Committee. Accepted. Electric lighting installation at Victoria Market Hall (£180).—Phillips Electricity Supplies, Ltd.

Swansea.—Electricity Committee. Accepted. Chlorination plant (£4,968).—Wallace & Tiernan. Modification of milling plant of boilers at Tir John station (£20,930).—International Combustion. Six 750-kVA transformers (£4,998).—British Power Transformer Co.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Ashton-under-Lyne.—Two nurseries, welfare centres and clinics (£17,500); A. T. Kemp, borough surveyor.

Bedlington (Northumberland). — Factory for Welwyn Laboratories; W. Stockdale, 73, Howard Street, North Shields.

Birmingham.—Motor omnibus garage, Quinton; general manager, City Transport Department, Congreve Street.

Blackburn.—Departmental stores, Victoria Street and Church Street; Littlewoods Mail Order Stores, 100, Old Hall Street, Liverpool.

Brampton.—Houses (50), Cotehill, for Brampton Public Society; J. Millar & Sons, builders, 15, London Road, Carlisle.

Brighton.—Adaptation of Buckingham House, Shoreham, as children's nursery (£12,000); borough engineer.

Buckingham.—Houses (30) for R.D.C. (£43,948); Y. J. Lovell & Son, Ltd., builders, Marsham Lane, Gerrards Cross.

Chesterfield.—Houses (500), at Eckington, for R.D.C.; J. B. Wikeley, surveyor, Rural Council House.

Clay Cross.—Hosiery factory, Bridge Street; John Smedley, Ltd., Lea Mills, Matlock.

Clitheroe.—Houses (32) for R.D.C. (£42,176); W. Houghton & Sons, builders, Tower House, Grimsargh, Preston.

Dalton. — Works for Imperial Chemical Industries, Ltd.; John Mowlem & Co., Ltd., builders, 91, Ebury Bridge Road, Pimlico, London, S.W.1.

Dartford.—Houses (102), Temple Hill estate (£132,537); Gough-Cooper & Co., Ltd.

Denton (Lancs).—Public baths; J. B. Cooke, surveyor, Town Hall.

Easington.—Central bus station at Easington Village; R.D.C. surveyor.

Erith.—Houses (42), Riverdale Road and Lesney Farm estate (£49,340); H. Friday & Sons, Ltd., builders, Northend Works.

Felling-on-Tyne.—Bottling factory for A. Towers & Co., Temple Street, Newcastle; E. M. Lawson, Barras Buildings, Barras Bridge, Newcastle.

Fence Houses (Co. Durham).—Factories on new trading estate for North-Eastern Trading Estates, Ltd., Gateshead; Mauchlen & Weightman, architects, 12, Saville Row, Newcastle-on-Tyne.

Filton.—Nursery school; county architect, Shire Hall, Gloucester.

Foleshill (Coventry).—Rebuilding works, Kingfield, for J. & J. Cash, Ltd., textile manufacturers; J. Parnell & Son, builders, Oliver Street, Rugby.

Glasgow.—School buildings at Cardonald (£40,000), at Bernard Street Junior Secondary School (£45,000), and at Whitehill Junior Secondary School (£50,000) for Corporation Education Department; city architect.

Golborne.—Houses (80) and bungalows (10), Derby Road site, for U.D.C.; A. Clough, surveyor.

Heywood.—Works additions; Ames Crosta Mills & Co., Ltd., Moss Ironworks.

Horden Colliery (Durham).— Kitchen for 2,000 meals; J. Berriman, Fence Houses, Co. Durham.

Jarrow.—Garage, Station Street, for the Northern General Transport Co., Ltd., Chester-le-Street.

Houses (146), Bilton Hall estate ; H. W. T. Perkins, borough engineer.

Kearsley.—School canteen (1,000 meals), Lord Street; G. Noel Hill, county architect, County Offices, Preston.

Keighley.—Houses (100); Thomas Feather & Co. (Bradford), Ltd., builders, Six Lane Ends, Bradford.

Kelso.—Housing scheme (electric), for Town Council; borough engineer.

Lambeth.—Houses (46), Elder Road (£71,473); borough engineer.

Leith.—Building to house radar equipment for Leith Nautical College; principal.

Liverpool.—Houses (73), Woolton (£81,954); J. W. Jones & Sons, Ltd., builders, 158, Allerton Road, Wavertree.

Newcastle-on-Tyne.—Houses (114), at Walker, for City Council; Harvey & Co., Milburn House.

Newcastle (Staffs).—School kitchen and dining hall, Ellison Street Schools; A. Cotton, schools architect, Lancaster Building.

Ice-cream factory; Cotton, Son & Richards, architects, Tunstall.

North Riding.—Schools at Whitby and Ormesby (£70,000); county architect, County Hall, Northallerton.

Perth.—Houses (560); burgh surveyor.

Plymouth.—Reinstatement of wards at city hospital, flats at Peel Street, Stonehouse, and part of Salisbury Road School; city architect, Weston Lodge, Seymour Road.

Portland.—Houses (54), Pound Piece, for U.D.C.; Kent & Sussex Contractors, Ltd., Carlton Road, Erith.

Prescot.—Houses (200), Bryer estate; U.D.C. surveyor, Council Offices, High Street.

Redditch.—Three schools and Grammar School; L. C. Lomas, county architect, 60, The Tything, Worcester.

Rushden.—Permanent houses (120), Higham Road estate; surveyor, Council Buildings.

St. Helens.—Factory for Tootal-Broadhurst Lee Co., Ltd., Manchester; R. T. James, consulting engineer, 6, Lower Grosvenor Place, London, S.W.1.

Sheffield.—Works extensions, Stocksbridge; Samuel Fox & Co., Ltd., steel manufacturers, Stocksbridge.

Shildon (Co. Durham).—Factory for the Barry Manufacturing Co.; W. Moss & Co., St. Mary's Place, Newcastle-on-Tyne.

South Shields.—Rebuilding of war-destroyed stores in King Street for F. W. Woolworth & Co., Ltd., London.

Three dining rooms at Mortimer secondary and primary schools; borough engineer.

Houses (152), Cussins type; Gustavus Bailey, Ltd., builders, King Street.

Stalybridge.—Garage and workshop, Tame Valley, for Joint Transport Committee; S. T. Davies, acting transport manager.

Stanley (Co. Durham).—Houses (42), Pike Street, Dipton; U.D.C. surveyor.

Stourbridge. — Extensions to Children's Homes, Clent Grove, Clent; secretary to Sunfield Homes Trustees, Clent.

Sunderland.—Two factories on the Pallion Estate, for North-Eastern Trading Estates, Ltd.; R. G. Finlay, Ltd., builders, West Sunniside.

Tynemouth. — Houses (50); J. H. Rogers, Queen Alexandra Road, North Shields.

Wadebridge. — Houses (28) for R.D.C.; W. E. Blackwell, clerk, Council Offices.

Walsall.—County and nursery schools, Harden Road (£75,132); borough engineer.

Houses (100), Dudley Fields estate (£136,080); Tarslag, Ltd., Wolverhampton.

Watford.—Houses (1,000), L.C.C. Oxhey estate (£1,498,044); Unit Construction Co., Ltd., Westminster.

West Hartlepool.—Eleven primary schools; borough engineer.

Worsborough.—Factory; Johnson & Barnes, Ltd., hosiery manufacturers; Stapleford, Notts.

ELECTRICAL REVIEW

VOL. CXXXIX. DECEMBER 27, 1946 NO. 360

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JAN 20 1947

"and with regard to LIGHTING..."

I must say the Mazda people were tremendously helpful. Qualified engineers from their Lighting Advisory Service took voluminous notes of the number of people to be employed; the class of work they will undertake; the arrangement of the machines to be installed, etc., etc. Later they submitted the finest lighting plan I have ever known."

LIGHTING ADVISORY SERVICE *All who are concerned with the installation or renewal of lighting are invited to communicate with our Lighting Advisory Service, Bridle Path, Watford. Phone 7701*

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FRIENDS
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Happy Xmas
and a
Happier New Year
LONDON ELECTRICAL COMPANY (BLACKFRIARS) LTD
WATERLOO 5620
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WHO'S *been looking through my eyes?*

This automatically-controlled HEATRAE Electric Water Heater is indeed a boon to us housewives. Just the type we've always wanted, providing instant hot water when required.

Although men won't acknowledge it, they ARE impatient, but my husband cannot speak too highly of Heatrae for its instancy at all times.

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ELECTRIC WELDING MACHINES

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Victoria Road, Willesden Junction, N.W.10

Dynamos, Motors, Alternators and Transformers Rewound and Re-constructed. "Westminster" Brush Holders. Process Arc Lamps.

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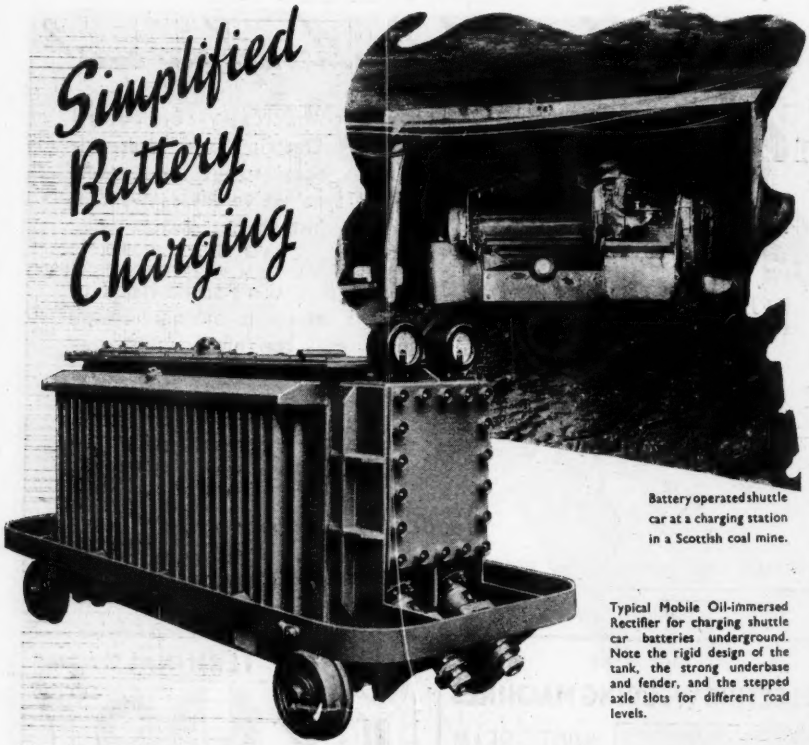
to the specific requirements of our customers

Makers of all types of repetition products from the bar in all metals

M·C·L and REPETITION LTD.

Pool Lane · Langley · Birmingham.

Simplified Battery Charging



Battery operated shuttle car at a charging station in a Scottish coal mine.

Typical Mobile Oil-immersed Rectifier for charging shuttle car batteries underground. Note the rigid design of the tank, the strong underbase and fender, and the stepped axle slots for different road levels.

With this new MOBILE OIL-IMMERSED RECTIFIER battery charging direct from the A.C. mains becomes a simple and economical operation.

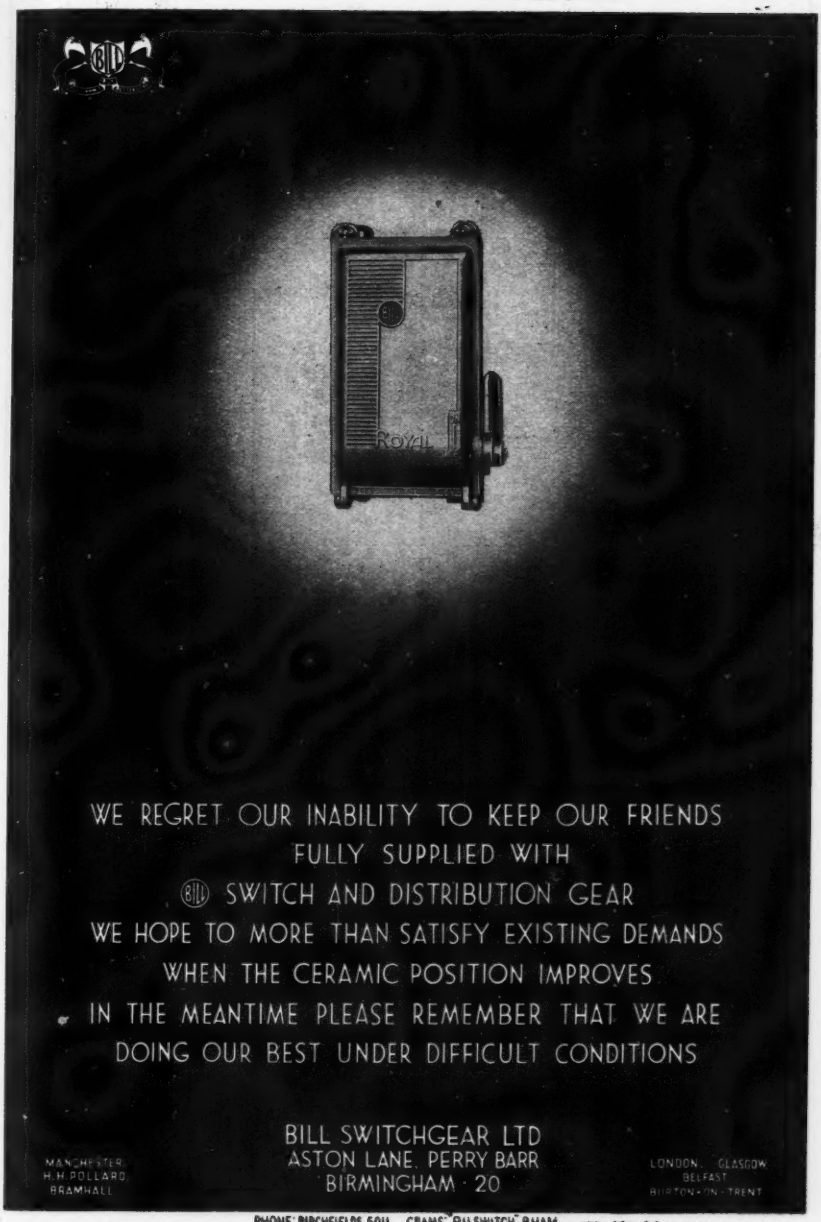
It is completely self-contained, transportable, takes up comparatively small space, and simplicity in design reduces maintenance to a minimum.

ADVANTAGES

- Compact — Light Weight.
- Supplied Ready for Use.
- Transportable.
- Easy to Install.
- Simple to Operate.
- Battery Cannot Discharge into Rectifier.
- No Moving Parts — No Wear.
- Fool-Proof.
- Low Maintenance.

PEEBLES

BRUCE PEEBLES & CO. LTD., ENGINEERS, EDINBURGH.



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FULLY SUPPLIED WITH
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WE HOPE TO MORE THAN SATISFY EXISTING DEMANDS
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CRYSELCO LIMITED, KEMPSTON WORKS, BEDFORD

Announcement

DMA
DYNAMO AND MOTOR ASSOCIATION

DYNAMO AND MOTOR PRICES

The Associated Dynamo and Motor Manufacturers named below announce that on and from 1st January, 1947, all outstanding price lists will be cancelled.

Details of new prices may be obtained on application to your usual suppliers.

British Thomson-Houston Co., Ltd.
Brush Electrical Engineering Co., Ltd.
Bull Motors (E. R. & F. Turner Ltd.)
Crompton Parkinson Ltd.
Greenwood & Batley Ltd.
Harland Engineering Co., Ltd.
Hopkinson Motors & Electric Co., Ltd.
Lancashire Dynamo & Crypto Ltd.
Laurence Scott & Electromotors Ltd.
Macfarlane Engineering Co., Ltd.
Mather & Platt Ltd.
Mawdsley's Ltd.
Metropolitan-Vickers Electrical Co., Ltd.
Bruce Peebles & Co., Ltd.
A. Reyrolle & Co., Ltd.
Veritys Ltd.

An un-retouched photograph of a Harland concentric-wound stator before impregnation.

★BELIEVE★IT★OR★NOT...

It is easier to believe a photograph such as this than it is to believe glib phrases about "quality" and "craftsmanship." This is indisputable evidence—proof of the skill employed and craftsmanship displayed in the production of Harland motors.

These qualities are reflected in the lasting-power and operational efficiency of all Harland Electrics—be they A.C. or D.C. motors, generators or alternators.

HARLAND

● THE HARLAND ENGINEERING CO. LTD.
Works: ALLOA · SCOTLAND ● London Office:—
HARLAND HOUSE, 20 PARK ST., W.1., Telephone Grosvenor 1221 ● OTHER BRANCHES AT MANCHESTER GLASGOW, BIRMINGHAM, BRISTOL, HULL, LEEDS, NEW CASTLE-ON-TYNE, NOTTINGHAM AND SWANSEA

6-361

Hicycle HISTORIES No. 2

PROBLEM: Drilling and Tapping on Loco. Work.

CASE REPORT. In one boiler repair shop staybolt drilling and tapping had always caused a serious bottleneck. Hicycle tools were recommended for the work and were eventually adopted by the work's engineers. The high constant-speed Hicycle Drills with their air-feed cylinders and balance-suspension immediately cut drilling times to a fraction . . . Hicycle Tappers followed up to give clean threads, free from distortion, and, instead of lagging behind as formerly, this bottleneck no longer existed.

CONCLUSION. Hicycle efficiency, constant speed, lightness, safety, reliability, economy and less operator fatigue represent the greatest step forward of recent years in the application of power electric tools to locomotive construction and repair.

This advertisement describes a problem solved by CP on locomotive work. You also will have production problems which can be solved by CP engineers.

AIR COMPRESSORS · PNEUMATIC TOOLS · ELECTRIC TOOLS · DIESEL ENGINES · VACUUM PUMPS
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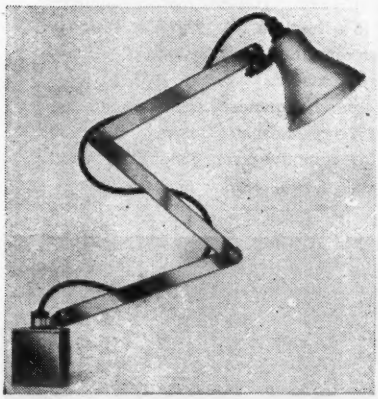
THE BEST WORK DEMANDS THE BEST LIGHT



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- *Shielded from operator's eyes.*
- *Horizontal or Vertical Mounting*
- *Single, Double or Three Arm Extension.*
- *Illustrated Catalogue sent on request.*

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BRISTOL—2 & 4 Church Street, Temple.
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Midland Representative:
W. T. BOWER, 184 Jockey Road, Sutton Coldfield.

FOR INVARIABLE ACCURACY at varying temperatures

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MULTI-POLE WEATHERPROOF METAL-CLAD PLUGS & SOCKETS

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For Electric Lighting and Power, Transmission, Communication, Portable Tools, etc.

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Flange Plug and Cover

Plug

Plain Socket

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VARNISHED GLASS FABRICS and TAPES . . .

Build smaller and more efficient motors by using Ioco varnished glass fabrics and tapes. They are specially designed to resist high voltage at elevated temperatures.

We also manufacture INSULATING AND OILED FABRICS FOR CABLE WORK. SWITCHBOARD RUBBER MATS. AND ELECTRICIANS' RUBBER GLOVES.

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A clean factory means better business

HAVE YOU A DUST PROBLEM?

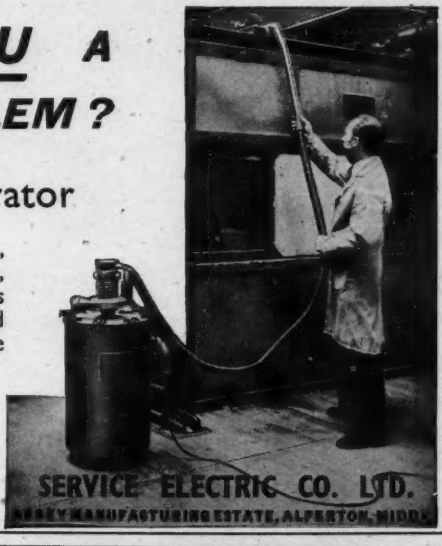
THE
'Secomak' Separator
(Regd.)

easily reaches ledges, overhead pipes and beams, inside machines, cleans factory floors, walls and collects dust from anywhere

- POWERFUL SUCTION UNIT
- LARGE CAPACITY
- EASY TO USE

Less than half the cost of the usual type of industrial cleaner

Send for data sheet 105/42E



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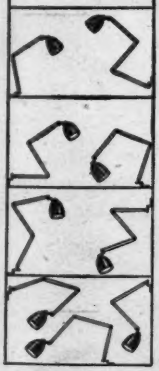
HORIZONTAL OR VERTICAL MOUNTING FOR LARGE BSS CONDUIT BOX.



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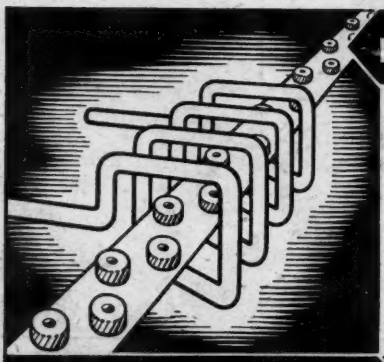
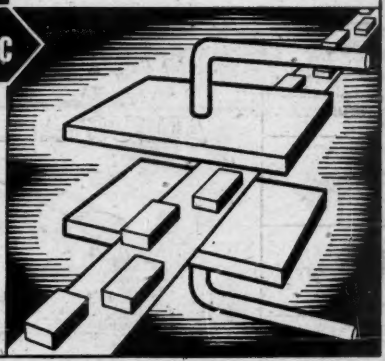
G.E.C.
HIGH FREQUENCY HEATING



INDUCTION

- BRAZING
- HARDENING
- MELTING

DIELECTRIC



- GLUING
- PLASTIC HEATING
- DRYING

G.E.C. engineers are at your disposal to advise upon the applications of High Frequency Heating.

Generators range from 100 watts to 25 kW output.

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